

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

- Southbound left turn lane
- Eastbound left turn lane
- Westbound left turn lane
- Los Coyotes Diagonal/Bellflower Boulevard
 - Eastbound left turn lane
 - Westbound left turn lane
- Willow Street/Los Coyotes Diagonal
 - Southbound left turn lane
 - Eastbound left turn lane
 - Westbound left turn lane
- Willow Street/Woodruff Avenue
 - Northbound left turn lane
 - Southbound right turn lane
 - Eastbound left turn lane
 - Westbound left turn lane
- Stearns Street/Palo Verde
 - Northbound left turn lane
 - Eastbound left turn lane
 - Westbound left turn lane
- Atherton Street/Studebaker Road
 - Eastbound left turn lane
- SR-22 WB On/Off-Ramp/Studebaker Road
 - Southbound left turn lane
- SR-22 EB On/Off-Ramp/Studebaker Road
 - Northbound right turn lane
 - Southbound left turn lane
- 7th Street/Pacific Coast Highway
 - Southbound left turn lane
- 7th Street/Bellflower Boulevard
 - Northbound right turn lane
 - Southbound left turn lane
 - Southbound right turn lane
 - Eastbound left turn lane
- Pacific Coast Highway/Bellflower Boulevard
 - Southbound left turn lane
 - Eastbound left turn lane
- 7th Street/W. Campus Drive
 - Southbound left/right turn lane
- 7th Street/E. Campus Drive
 - Southbound left turn lane
 - Eastbound left turn lane

The freeway off-ramp vehicle queuing is also shown in Table 4.5-4. During the peak hours, two freeway off-ramp locations are anticipated to exceed the available storage length under year 2040 Alternative 2 conditions:

PARSONS

4-23

Orange County Transportation Authority

DRAFT

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

- Carson Street/I-605 SB Off-Ramp
 - Southbound left turn lane
- SR-22 EB On/Off-Ramp/Studebaker Road
 - Westbound right turn lane

4.5.4 Alternative 2 (Year 2020) Freeway Traffic Analysis

Findings for the northbound and southbound freeway segments under Alternative 2 conditions for year 2020 are summarized in Table 4.5-5. The peak hour capacity, demand volume, D/C ratio, density and LOS for all the freeway segments are shown.

Under Alternative 2 conditions for year 2020, the I-405 freeway mainline segments are projected to operate at either LOS E or F during the AM and PM peak hours in both directions with few exceptions. The exceptions include the I-405 southbound segments between Studebaker Road to I-605 southbound ramp which is projected to operate at LOS D during the AM peak hour. Majority of the northbound and southbound I-405 HOV lanes are anticipated to operate at over-capacity during the AM or PM peak hours under year 2020 Alternative 2 conditions with D/C ratios ranging from 1.04 to 1.46.

Under Alternative 2 conditions for year 2020, the I-605 freeway mainline segments are projected to operate between LOS B and LOS E during the AM and PM peak hours in both directions except for the segment between Carson Street and Spring Street, which southbound movement is anticipated to operate at LOS E during both the AM and PM peak hour.

Under Alternative 2 conditions for year 2020, the SR-22th Street freeway mainline segment between Pepper Tree Lane and Studebaker Road, is anticipated to operate at LOS B or LOS C during the AM and PM peak hours in both directions, while the segment between Studebaker Road and I-605, is anticipated to operate from LOS D to LOS F during the AM and PM peak hours in both directions.

Ramps and Ramp-Freeway Junction Analysis and Levels of Service

The density and LOS for each of the ramps along I-405, I-605 and SR-22th Street within the study area for Alternative 2 are based on projected Alternative 2 year 2020 traffic volumes. Table 4.5-6 provide a summary of the findings from the analyses for year 2020 Alternative 2 conditions during the AM and PM peak hours. The peak hour capacity, demand volume, D/C ratio, density, and LOS for each of the freeway ramps are presented.

Under Alternative 2 conditions for year 2020, the projected LOS for the I-405 ramp junctions generally ranges from LOS B to LOS F, depending upon time of day and direction of travel. For the I-605 ramp junctions, the peak hour LOS generally ranges from LOS A to LOS E, depending upon time of day and direction of travel. The peak hour LOS expected for the SR-22th Street ramp junctions, generally ranges from LOS C to LOS F, depending upon time of day and direction of travel.

The freeway-to-freeway branch connectors are anticipated to operate at under-capacity during both AM and PM peak hours except at two locations. The D/C ratio for the branch connector

PARSONS

4-24

Orange County Transportation Authority

DRAFT

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

from I-605 southbound to 7th Street/I-405 is anticipated to be 1.42 and 1.17 during the AM and PM peak hours, respectively. The branch connector from I-605 southbound/I-405 southbound to 7th Street is expected to have a D/C ratio of 1.14 during the AM peak hour.

Weaving Analysis

Weaving analysis was conducted between on-ramps and off-ramps spaced less than 2,500 feet apart. Separate analyses were conducted, as appropriate, for freeways and C-D roads. Weaving analysis for Alternative 2 are based on projected year 2020 Alternative 2 traffic volumes. Table 4.5-7 summarizes the weaving analysis findings for year 2020 conditions for Alternative 2 for both the freeway segments and the C-D roads. The density and LOS for all the weaving sections are shown.

Under year 2020 Alternative 2 condition, the I-405 freeway weaving segments are anticipated to operate at LOS E or LOS F during the peak hours except at one location during the AM peak hour. The I-405 southbound freeway weaving segment between Palo Verde Avenue/Stearns Street and Studebaker Road is expected to operate at LOS D during the AM peak hour. Weaving analysis was conducted for the C-D roads at the Lakewood Boulevard/Willow Street interchange and the Bellflower Boulevard/Los Coyotes Diagonal interchange. The analysis shows that the weaving segments on the C-D roads are anticipated to operate between LOS A and C during the peak hours.

4.5.5 Alternative 2 (Year 2040) Freeway Traffic Analysis

Findings for the northbound and southbound freeway segments under Alternative 2 conditions for year 2040 are summarized in Table 4.5-8. The peak hour capacity, demand volume, D/C ratio, density and LOS for all the freeway segments are shown.

Under Alternative 2 conditions for year 2040, the I-405 freeway mainline segments are projected to operate at either LOS E or F during the AM and PM peak hours in both directions. The northbound and southbound I-405 HOV lanes within the project limits are anticipated to operate at over-capacity during the AM or PM peak hours under year 2020 No Build Alternative conditions with D/C ratios ranging from 1.06 to 1.58.

Under Alternative 2 conditions for year 2040, the I-605 freeway mainline segments are anticipated to operate between LOS C and LOS D during the AM and PM peak hours in both directions except for the freeway segment between Carson Street and Spring Street. The southbound I-605 freeway segment between Carson Street and Spring Street is anticipated to operate at LOS F and E during the AM and PM peak hours, respectively.

Under Alternative 2 conditions for year 2040, the SR-227th Street freeway mainline segment between Pepper Tree Lane and Studebaker Road, is anticipated to operate at LOS B or LOS C during the AM and PM peak hours in both directions, while the segment between Studebaker Road and I-605, is anticipated to operate between LOS D to LOS F during the AM and PM peak hours in both directions.

PARSONS

4-25

Orange County Transportation Authority

DRAFT

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Ramps and Ramp-Freeway Junction Analysis and Levels of Service

The density and LOS for each of the ramps along I-405, I-605 and SR-227th Street within the study area for Alternative 2 are based on projected year 2040 Alternative 2 traffic volumes. Table 4.5-9 provide a summary of the findings from the analysis for year 2040 Alternative 2 conditions during the AM and PM peak hours. The peak hour capacity, demand volume, D/C ratio, density, and LOS for each of the freeway ramps are presented.

Under Alternative 2 conditions for year 2040, the projected LOS for the I-405 ramp junctions generally ranges from LOS B to LOS F, depending upon time of day and direction of travel. For the I-605 ramp junctions, the peak hour LOS generally ranges from LOS A to LOS F, depending upon time of day and direction of travel. The peak hour LOS expected for the SR-227th Street ramp junctions, generally ranges from LOS C to LOS F, depending upon time of day and direction of travel.

The freeway-to-freeway branch connectors are anticipated to operate at under-capacity during both AM and PM peak hours except at two locations. The D/C ratio for the branch connector from I-605 southbound to 7th Street/I-405 is anticipated to be 1.54 and 1.26 during the AM and PM peak hours, respectively. The branch connector from I-605 southbound/I-405 southbound to 7th Street is expected to have a D/C ratio of 1.14 during the AM peak hour.

Weaving Analysis

Weaving analysis was conducted between on-ramps and off-ramps spaced less than 2,500 feet apart. Separate analyses were conducted, as appropriate, for freeways and C-D roads. Weaving analysis for Alternative 2 is based on projected year 2040 Alternative 2 traffic volumes. Table 4.5-10 summarizes the weaving analysis findings for year 2040 conditions for Alternative 2 for both the freeway segments and the C-D roads.

For year 2040 conditions, the mainline freeway weaving segments are projected to operate at LOS E to LOS F during the peak hours. Weaving analysis was conducted for the C-D roads at the Lakewood Boulevard/Willow Street interchange and the Bellflower Boulevard/Los Coyotes Diagonal interchange. The analysis shows that the weaving segments on the C-D roads are anticipated to operate between LOS A and C during the peak hours.

4.5.6 Alternative 2 vs. No Build Alternative Comparison and Proposed Roadway Improvements

Intersection

Table 4.5-12 presents a comparison of Year 2040 No Build Alternative and Year 2040 Alternative 2 operating conditions anticipated for the study intersections. As shown in the table, the majority of the intersections with an "Exceed Evaluation" are projected to operate with LOS F during the AM/PM peak hour under the No-Build Alternative. These intersections under Alternative 2 are projected to operate with LOS F during the AM/PM peak hour but with an increase in the D/C ratio.

Based on the comparison analysis, the following roadway improvements could be considered to improve intersections year 2040 operating conditions:

PARSONS

4-26

Orange County Transportation Authority

DRAFT

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Willow Street and Bellflower Boulevard intersection (during PM peak hour and under No-Build Alternative projected D/C ratio is 1.09 and LOS E, and under Alternative 2 projected D/C ratio is 1.25 and LOS F).

- Add an exclusive right-turn lane to eastbound approach; and
- Add a 2nd left-turn lane to westbound approach.

As shown on **Figure 4.5-5**, these proposed roadway improvements could be accommodated within the existing right-of-way.

Willow Street and Los Coyotes Diagonal intersection (during PM peak hour and under No-Build Alternative projected D/C ratio is 1.18 and LOS F, and under Alternative 2 projected D/C ratio is 1.41 and LOS F).

- Add a 2nd left-turn lane to eastbound approach; and
- Add a 2nd left-turn lane to southbound approach.

As shown on **Figure 4.5-6**, these proposed roadway improvements could be accommodated within the existing right-of-way.

Willow Street and Woodruff Avenue intersection (during AM peak hour and under No-Build Alternative projected D/C ratio is 1.44 and LOS F, and under Alternative 2 projected D/C ratio is 1.53 and LOS F).

- Add a 2nd left-turn lane to northbound approach.

As shown on **Figure 4.5-7**, this proposed roadway improvement could be accommodated within the existing right-of-way.

SR-22 westbound on/off Ramp and College Park Drive intersection (during PM peak hour and under No-Build Alternative projected D/C ratio is 1.16 and LOS F, and under Alternative 2 projected D/C ratio is 1.24 and LOS F).

- Widen SR-22 westbound On/Off Ramp from one lane to two lanes approximately 200 feet east of the intersection extending to Studebaker Road as shown on the figure below. This roadway improvement could be accommodated with existing right-of-way; and
- Provide a traffic signal to control traffic movements instead of existing one-way stop control placed at the westbound College Park Drive.

As shown on **Figure 4.4-5**, these proposed roadway improvements could be accommodated within the existing right-of-way.

7th Street and Pacific Coast Highway intersection (during PM peak hour and under No-Build Alternative projected D/C ratio is 1.03 and LOS E, and under Alternative 2 projected D/C ratio is 1.07 and LOS F).

- Add an exclusive right-turn lane to northbound approach.

PARSONS

4-27

Orange County Transportation Authority

DRAFT

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

As shown on **Figure 4.5-8**, this proposed roadway improvement could be accommodated within the existing right-of-way.

7th Street and Bellflower Boulevard intersection (during AM peak hour and under No-Build Alternative projected D/C ratio is 1.13 and LOS F, and under Alternative 2 projected D/C ratio is 1.18 and LOS F).

- Add an exclusive right-turn lane to westbound approach.

As shown on **Figure 4.5-9**, this proposed roadway improvement could be accommodated within the existing right-of-way.

7th Street and West Campus Drive intersection (during AM peak hour and under No-Build Alternative projected D/C ratio is 0.85 and LOS D, and under Alternative 2 projected D/C ratio is 0.89 and LOS E).

- Add an exclusive right-turn lane to westbound approach.

As shown on **Figure 4.5-10**, the proposed roadway improvement could be accommodated within the existing right-of-way.

7th Street and East Campus Drive intersection (during AM peak hour and under No-Build Alternative projected D/C ratio is 1.12 and LOS F, and under Alternative 2 projected D/C ratio is 1.17 and LOS F).

- Add a right-turn lane to westbound approach.

As shown on **Figure 4.5-11**, the proposed roadway improvement could be accommodated within the existing right-of-way.

Table 4.5-11 presents a comparison of Year 2020 No Build Alternative and Year 2020 Alternative 2 operating conditions anticipated for the study intersections. As shown in the table, roadway improvements for four (4) intersections (out of the eight listed above) are necessary by year 2020 under both the No-Build Alternative and Alternative 2 to improve intersections operating condition that are projected to operate at LOS F during the AM/PM peak hour.

Table 4.5-12 shows intersections LOS and D/C ratio during AM and PM peak hours for Year 2040 Alternative 2 with recommended roadway improvements.

Freeway Mainline

Table 4.5-13 presents a comparison of 2020 No Build and 2020 Alternative 2 operating conditions anticipated for the mainline freeway segments. The table shows that there is an increase in the D/C ratio from the No Build Alternative to Alternative 2 in many segments, with the range of increase in the GP lanes from 0.01 to 0.18 during peak hours. Higher levels of increase are generally found closer to the limits of the project improvements and diminish with increasing distance from those limits. There are several segments in which there is a decrease in the D/C ratio, shown in red on **Table 4.5-13**. Those segments that are anticipated to have a change in LOS are identified in the Evaluation column in the table.

PARSONS

4-28

Orange County Transportation Authority

DRAFT

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.5-14 presents a comparison of 2040 No Build and 2040 Alternative 2 operating conditions anticipated for the mainline freeway segments. The table shows that there is an increase in the D/C ratio from the No Build Alternative to Alternative 1 in many segments, with the range of increase in the GP lanes from 0.01 to 0.19 during peak hours. Higher levels of increase are generally found closer to the limits of the project improvements and diminish with increasing distance from those limits. There are several segments in which there is a decrease in the D/C ratio, shown in red on Table 4.5-14. Those segments that are anticipated to have a change in LOS are identified in the Evaluation column in the table.

4.6 Alternative 3 Conditions

This section of the report provides an analysis of the study intersections and mainline freeway as well as the freeway/ramp junction locations for years 2020 and 2040 Alternative 3 conditions. Alternative 3 condition analyses are based on forecasted years 2020 and 2040 Alternative 3 traffic volumes and year 2009 traffic control/lane geometrics at the study intersections and freeway segments and ramps within the project limits. As discussed in Section 4.1, geometric conditions and type of traffic control for years 2020 and 2040 are assumed to be unchanged from existing conditions (Year 2009). Intersection analysis worksheets for years 2020 and 2040 Alternative 3 conditions are provided in Appendix IX.A. Freeway analyses worksheets for years 2020 and 2040 Alternative 3 conditions are provided in Appendix IX.B.

4.6.1 Alternative 3 Traffic Volumes

Year 2020 Alternative 3 intersection peak hour traffic volumes are presented in Figure 4.6-1. Year 2040 Alternative 3 intersection peak hour traffic volumes are presented in Figure 4.6-2. Years 2020 and 2040 Alternative 3 peak hour traffic volumes for the I-405 mainline, I-605 mainline and SR-22/7th Street mainline and all interchange ramps within the study area are illustrated in Figures 4.6-3 and 4.6-4, respectively.

4.6.2 Alternative 3 (Year 2020) Intersection Traffic Analysis

A summary of LOS for AM and PM peak hours for year 2020 Alternative 3 conditions, including traffic control at study intersections, is provided in Table 4.6-1. The LOS analysis conducted for year 2020 Alternative 3 conditions indicates that all study intersections are anticipated to operate at LOS D or better during the AM and PM peak hours except for the following intersections that are anticipated to operating at LOS E or F during the AM or PM peak hours:

- Willow Street/Bellflower Boulevard (PM LOS = E and D/C = 1.15)
- Willow Street/Los Coyotes Diagonal (PM LOS = E and D/C = 1.26)
- Willow Street/Woodruff Avenue (AM LOS = F and D/C = 1.30)
- I-405 SB Direct Off-Ramp/Studebaker Rd (AM LOS = F and D/C = 1.04)
- SR-22 WB On/Off-Ramp/College Park Dr (PM LOS = F and D/C = 0.32)
- 7th Street/Bellflower Boulevard (AM LOS = E and D/C = 1.09)

A comparison of year 2020 Alternative 3 vehicle queuing (AM and PM peak hour 95th percentile queues) and available queue storage (in feet) is included in Table 4.6-2. During the peak hours,

PARSONS

4-29

Orange County Transportation Authority

DRAFT

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

most of the turn pockets at the arterial intersections are anticipated to provide sufficient queue storage except at the following locations:

- Carson Street/Pioneer Boulevard
 - Northbound left turn lane
 - Eastbound left turn lane
- Willow Street/Bellflower Boulevard
 - Northbound left turn lane
 - Southbound left turn lane
 - Eastbound left turn lane
 - Westbound left turn lane
- Los Coyotes Diagonal/Bellflower Boulevard
 - Eastbound left turn lane
 - Westbound left turn lane
- Willow Street/Los Coyotes Diagonal
 - Southbound left turn lane
 - Westbound left turn lane
- Willow Street/Woodruff Avenue
 - Northbound left turn lane
 - Southbound left turn lane
 - Southbound right turn lane
 - Eastbound left turn lane
 - Westbound left turn lane
- Stearns Street/Palo Verde
 - Northbound left turn lane
 - Southbound left turn lane
 - Eastbound left turn lane
 - Westbound left turn lane
- Atherton Street/Studebaker Road
 - Eastbound left turn lane
- SR-22 EB On/Off-Ramp/Studebaker Road
 - Northbound right turn lane
 - Southbound left turn lane
- 7th Street/Pacific Coast Highway
 - Southbound left turn lane
- 7th Street/Bellflower Boulevard
 - Southbound left turn lane
 - Southbound right turn lane
 - Eastbound left turn lane
- Pacific Coast Highway/Bellflower Boulevard
 - Southbound left turn lane
 - Eastbound left turn lane
- 7th Street/W. Campus Drive
 - Southbound left/right turn lane
- 7th Street/E. Campus Drive

PARSONS

4-30

Orange County Transportation Authority

DRAFT

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

- Southbound left turn lane
- Eastbound left turn lane

The freeway off-ramp vehicle queuing is also shown in Table 4.6-2. During the peak hours, two freeway off-ramp locations are anticipated to exceed the available storage length under year 2020 Alternative 3 conditions:

- Carson Street/I-605 SB Off-Ramp
 - Southbound left turn lane
- SR-22 EB On/Off-Ramp/Studebaker Road
 - Westbound right turn lane

4.6.3 Alternative 3 (Year 2040) Intersection Traffic Analysis

A summary of LOS for AM and PM peak hours for year 2040 Alternative 3 conditions, including traffic control at study intersections, is provided in Table 4.6-3. The LOS analysis conducted for year 2040 Alternative 3 conditions indicates that all study intersections are anticipated to operate at LOS D or better during the AM and PM peak hours except for the following intersections that are anticipated to operate at LOS E or F during the AM or PM peak hours:

- Willow Street/Bellflower Boulevard (PM LOS = F, D/C = 1.25)
- Los Coyotes Diagonal/Bellflower Boulevard (PM LOS = E, D/C = 1.22)
- Willow Street/Los Coyotes Diagonal (PM LOS = F and D/C = 1.41)
- Willow Street/Woodruff Avenue (AM LOS = F and D/C = 1.40)
- I-405 SB Direct Off-Ramp/Studebaker Rd (AM LOS = F and D/C = 1.20)
- SR-22 WB On/Off-Ramp/College Park Dr (PM LOS = F and D/C = 0.45)
- 7th Street/Pacific Coast Highway (AM LOS = E and D/C = 1.04)
- 7th Street/Bellflower Boulevard (AM LOS = E and D/C = 1.17; PM LOS = E and D/C = 1.10)
- 7th Street/W. Campus Drive (AM LOS = E and D/C = 0.87; PM LOS = E, D/C = 0.93)
- 7th Street/E. Campus Drive (AM LOS = E and D/C = 1.14)

A comparison of year 2040 Alternative 3 vehicle queuing (AM and PM peak hour 95th percentile queues) and available queue storage (in feet) is included in Table 4.6-4. During the peak hours, most of the turn pockets at the arterial intersections are anticipated to provide sufficient queue storage except at the following locations:

- Carson Street/Pioneer Boulevard
 - Northbound left turn lane
 - Eastbound left turn lane
- Willow Street/Lakewood Boulevard
 - Westbound left turn lane
- Willow Street/Bellflower Boulevard
 - Northbound left turn lane
 - Southbound left turn lane
 - Eastbound left turn lane

PARSONS

4-31

Orange County Transportation Authority

DRAFT

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

- Westbound left turn lane
- Los Coyotes Diagonal/Bellflower Boulevard
 - Eastbound left turn lane
 - Westbound left turn lane
- Willow Street/Los Coyotes Diagonal
 - Southbound left turn lane
 - Westbound left turn lane
- Willow Street/Woodruff Avenue
 - Northbound left turn lane
 - Southbound left turn lane
 - Southbound right turn lane
 - Eastbound left turn lane
 - Westbound left turn lane
- Stearns Street/Palo Verde
 - Northbound left turn lane
 - Eastbound left turn lane
 - Westbound left turn lane
- Atherton Street/Studebaker Road
 - Eastbound left turn lane
- SR-22 WB On/Off-Ramp/Studebaker Road
 - Southbound right turn lane
- SR-22 EB On/Off-Ramp/Studebaker Road
 - Northbound right turn lane
 - Southbound left turn lane
- 7th Street/Pacific Coast Highway
 - Southbound left turn lane
- 7th Street/Bellflower Boulevard
 - Southbound left turn lane
 - Southbound right turn lane
 - Eastbound left turn lane
- Pacific Coast Highway/Bellflower Boulevard
 - Southbound left turn lane
 - Eastbound left turn lane
- 7th Street/W. Campus Drive
 - Southbound left/right turn lane
- 7th Street/E. Campus Drive
 - Southbound left turn lane
 - Eastbound left turn lane

The freeway off-ramp vehicle queuing is also shown in Table 4.6-4. During the peak hours, two freeway off-ramp locations are anticipated to exceed the available storage length under year 2040 Alternative 3 conditions:

- Carson Street/I-605 SB Off-Ramp
 - Southbound left turn lane

PARSONS

4-32

Orange County Transportation Authority

DRAFT

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

- SR-22 EB On/Off-Ramp/Studebaker Road
Westbound right turn lane

4.6.4 Alternative 3 (Year 2020) Freeway Traffic Analysis

Findings for the northbound and southbound freeway segments under Alternative 3 conditions for year 2020 are summarized in Table 4.6-5. The peak hour capacity, demand volume, D/C ratio, density and LOS for all the freeway segments are shown.

Under Alternative 3 conditions for year 2020, the I-405 freeway mainline segments are projected to operate at either LOS E or F during the AM and PM peak hours in both directions except at one location. The I-405 southbound segment between Studebaker Road to I-605 northbound off-ramp which is projected to operate at LOS D during the AM peak hour. Majority of the northbound and southbound I-405 HOV lanes are anticipated to operate at over-capacity during the AM or PM peak hours under year 2020 Alternative 3 conditions with D/C ratios ranging from 1.04 to 1.24.

Under Alternative 3 conditions for year 2020, the I-605 freeway mainline segments are projected to operate between LOS B and LOS D during the AM and PM peak hours in both directions except for the segment between Carson Street and Spring Street, which southbound movement is anticipated to operate at LOS E during both the AM and PM peak hour.

Under Alternative 3 conditions for year 2020, the SR-22/7th Street freeway mainline segment between Pepper Tree Lane and Studebaker Road, is anticipated to operate at LOS B or LOS C during the AM and PM peak hours in both directions, while the segment between Studebaker Road and I-605, is anticipated to operate from LOS D to LOS F during the AM and PM peak hours in both directions.

Ramps and Ramp-Freeway Junction Analysis and Levels of Service

The density and LOS for each of the ramps along I-405, I-605 and SR-22/7th Street within the study area for Alternative 3 are based on projected year 2020 Alternative 3 traffic volumes. Table 4.6-6 provide a summary of the findings from the analyses for year 2020 Alternative 3 conditions during the AM and PM peak hours. The peak hour capacity, demand volume, D/C ratio, density, and LOS for each of the freeway ramps are presented.

Under Alternative 3 conditions for year 2020, the projected LOS for the I-405 ramp junctions generally ranges from LOS B to LOS F, depending upon time of day and direction of travel. For the I-605 ramp junctions, the peak hour LOS generally ranges from LOS A to LOS E, depending upon time of day and direction of travel. The peak hour LOS expected for the SR-22/7th Street ramp junctions, generally ranges from LOS A to LOS F, depending upon time of day and direction of travel.

The freeway-to-freeway branch connectors are anticipated to operate at under-capacity during both AM and PM peak hours except at two locations. The D/C ratio for the branch connector from I-605 southbound to 7th Street/I-405 is anticipated to be 1.35 and 1.25 during the AM and PM peak hours, respectively. The branch connector from I-605 southbound/I-405 southbound to

PARSONS

4-33

Orange County Transportation Authority

DRAFT

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

7th Street is expected to have D/C ratios of 1.12 and 1.07 during the AM and PM peak hour, respectively.

Weaving Analysis

Weaving analysis was conducted between on-ramps and off-ramps spaced less than 2,500 feet apart. Separate analyses were conducted, as appropriate, for freeways and C-D roads. Weaving analysis for Alternative 3 is based on projected year 2020 Alternative 3 traffic volumes. Table 4.6-7 summarizes the weaving analysis findings for year 2020 conditions for Alternative 3 for both the freeway segments and the C-D roads. The density and LOS for all the weaving sections are shown.

Under year 2020 Alternative 3 condition, the I-405 freeway weaving segments are anticipated to operate at LOS E or LOS F during the peak hours except at one location during the AM peak hour. The I-405 southbound freeway weaving segment between Palo Verde Avenue/Stearns Street and Studebaker Road is expected to operate at LOS D during the AM peak hour. Weaving analysis was conducted for the C-D roads at the Lakewood Boulevard/Willow Street interchange and the Bellflower Boulevard/Los Coyotes Diagonal interchange. The analysis shows that the weaving segments on the C-D roads are anticipated to operate between LOS A and C during the peak hours.

4.6.5 Alternative 3 (Year 2040) Freeway Traffic Analysis

Findings for the northbound and southbound freeway segments under Alternative 3 conditions for year 2040 are summarized in Table 4.6-8. The peak hour capacity, demand volume, D/C ratio, density and LOS for all the freeway segments are shown.

Under Alternative 3 conditions for year 2040, the I-405 freeway mainline segments are projected to operate at either LOS E or F during the AM and PM peak hours in both directions. The northbound and southbound I-405 HOV lanes within the project limits are anticipated to operate at over-capacity during the AM or PM peak hours under year 2040 Alternative 3 conditions with D/C ratios ranging from 1.02 to 1.34.

Under Alternative 3 conditions for year 2040, the I-605 freeway mainline segments are anticipated to operate between LOS B and LOS D during the AM and PM peak hours in both directions except for the freeway segment between Carson Street and Spring Street. The southbound I-605 freeway segment between Carson Street and Spring Street is anticipated to operate at LOS F during the AM and PM peak hours.

Under Alternative 3 conditions for year 2040, the SR-22/7th Street freeway mainline segment between Pepper Tree Lane and Studebaker Road, is anticipated to operate at LOS B or LOS C during the AM and PM peak hours in both directions, while the segment between Studebaker Road and I-605, is anticipated to operate between LOS D to LOS F during the AM and PM peak hours in both directions.

Ramps and Ramp-Freeway Junction Analysis and Levels of Service

The density and LOS for each of the ramps along I-405, I-605 and SR-22/7th Street within the study area for Alternative 3 are based on projected year 2040 Alternative 3 traffic volumes.

PARSONS

4-34

Orange County Transportation Authority

DRAFT

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.6-9 provide a summary of the findings from the analysis for year 2040 Alternative 3 conditions during the AM and PM peak hours. The peak hour capacity, demand volume, D/C ratio, density, and LOS for each of the freeway ramps are presented.

Under Alternative 3 conditions for year 2040, the projected LOS for the I-405 ramp junctions generally ranges from LOS D to LOS F, depending upon time of day and direction of travel. For the I-605 ramp junctions, the peak hour LOS generally ranges from LOS A to LOS F, depending upon time of day and direction of travel. The ramp junctions along SR-227th Street are anticipated to operate at LOS D and F, depending upon time of day and direction of travel.

The freeway-to-freeway branch connectors are anticipated to operate at under-capacity during both AM and PM peak hours except at two locations. The D/C ratio for the branch connector from I-605 southbound to 7th Street/I-405 is anticipated to be 1.46 and 1.35 during the AM and PM peak hours, respectively. The branch connector from I-605 southbound/I-405 southbound to 7th Street is expected to have D/C ratios of 1.12 and 1.07 during the AM and PM peak hour.

Weaving Analysis

Weaving analysis was conducted between on-ramps and off-ramps spaced less than 2,500 feet apart. Separate analyses were conducted, as appropriate, for freeways and C-D roads. Weaving analysis for Alternative 3 is based on projected year 2040 Alternative 3 traffic volumes. **Table 4.6-10** summarizes the weaving analysis findings for year 2040 conditions for Alternative 3 for both the freeway segments and the C-D roads.

For year 2040 conditions, the mainline freeway weaving segments are projected to operate at LOS E or LOS F during the peak hours. Weaving analysis was conducted for the C-D roads at the Lakewood Boulevard/Willow Street interchange and the Bellflower Boulevard/Los Coyotes Diagonal interchange. The analysis shows that the weaving segments on the C-D roads are anticipated to operate between LOS A and C during the peak hours.

4.6.6 Alternative 3 vs. No Build Alternative Comparison and Proposed Roadway Improvements

Intersection

Table 4.6-12 presents a comparison of Year 2040 No Build Alternative and Year 2040 Alternative 3 operating conditions anticipated for the study intersections. As shown in the table, the majority of the intersections with an "Exceed Evaluation" are projected to operate with LOS F during the PM peak hour under the No-Build Alternative. These intersections under Alternative 3 are projected to operate with LOS F during the AM/PM peak hour but with an increase in the D/C ratio.

Based on the comparison analysis, the following roadway improvements could be considered to improve intersections year 2040 operating conditions:

Willow Street and Bellflower Boulevard intersection (during AM peak hour and under No-Build Alternative projected D/C ratio is 1.02 and LOS E, and under Alternative 2 projected D/C ratio is 1.25 and LOS F).

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4-35

Orange County Transportation Authority

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

- Add an exclusive right-turn lane to eastbound approach; and
- Add a 2nd left-turn lane to westbound approach.

As shown on **Figure 4.5-5**, these proposed roadway improvements could be accommodated within the existing right-of-way.

Los Coyotes Diagonal and Bellflower Boulevard intersection (during AM peak hour and under No-Build Alternative projected D/C ratio is 1.13 and LOS E, and under Alternative 2 projected D/C ratio is 1.22 and LOS F).

- Add a 2nd left-turn lane to eastbound approach.

As shown on **Figure 4.6-5**, this proposed roadway improvement could be accommodated within the existing right-of-way.

Willow Street and Los Coyotes Diagonal intersection (during AM peak hour and under No-Build Alternative projected D/C ratio is 1.18 and LOS E, and under Alternative 2 projected D/C ratio is 1.41 and LOS F).

- Add a 2nd left-turn lane to eastbound approach; and
- Add a 2nd left-turn lane to southbound approach.

As shown on **Figure 4.5-6**, these proposed roadway improvements could be accommodated within the existing right-of-way.

7th Street and Bellflower Boulevard intersection (during AM peak hour and under No-Build Alternative projected D/C ratio is 1.06 and LOS E, and under Alternative 2 projected D/C ratio is 1.10 and LOS F).

- Add an exclusive right-turn lane to westbound approach.

As shown on **Figure 4.5-9**, this proposed roadway improvement could be accommodated within the existing right-of-way.

Table 4.6-11 presents a comparison of Year 2020 No Build Alternative and Year 2020 Alternative 3 operating conditions anticipated for the study intersections. As shown in the table, roadway improvements for three intersections (out of the four listed above) are necessary by year 2020 under both the No-Build Alternative and Alternative 3 to improve intersections operating condition that are projected to operate at LOS F during the AM/PM peak hour.

Table 4.6-12 shows intersections LOS and D/C ratio during AM and PM peak hours for Year 2040 Alternative 3 with recommended roadway improvements.

Freeway Mainline

Table 4.6-13 presents a comparison of 2020 No Build and 2020 Alternative 3 operating conditions anticipated for the mainline freeway segments. The table shows that there is an increase in the D/C ratio from the No Build Alternative to Alternative 3 in many segments, with the range of increase in the GP lanes from 0.03 to 0.34 during peak hours. Higher levels of increase are generally found closer to the limits of the project improvements and diminish with

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4-36

Orange County Transportation Authority

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

increasing distance from those limits. There are several segments in which there is a decrease in the D/C ratio, shown in red on **Table 4.6-13**. Those segments that are anticipated to have a change in LOS are identified in the Evaluation column in the table.

Table 4.6-14 presents a comparison of 2040 No Build and 2040 Alternative 3 operating conditions anticipated for the mainline freeway segments. The table shows that there is an increase in the D/C ratio from the No Build Alternative to Alternative 3 in many segments, with the range of increase in the GP lanes from 0.02 to 0.37 during peak hours. Higher levels of increase are generally found closer to the limits of the project improvements and diminish with increasing distance from those limits. There are several segments in which there is a decrease in the D/C ratio, shown in red on **Table 4.6-14**. Those segments that are anticipated to have a change in LOS are identified in the Evaluation column in the table.

4.6.7 Transition Areas

This section summarizes the LOS expected in the transition areas associated with the Express Lanes in Alternative 3. Transition areas are along the freeways at the beginning and end of the Express Lanes and allow traffic in HOV and GP lanes to change lanes, if necessary, to access the GP and Express Lanes or vice versa. Transition areas may add new lanes and/or redesignate lanes from HOV to Express. The two proposed transition areas located within the study limits are as follows:

1. On I-605 at the I-405 interchange; and
2. On I-405 at the I-605 interchange.

Limits of transition areas approaching the start of the Express Lanes are defined upstream by the termination of an HOV restriction and downstream by the solid striping used to delineate the separation between the Express Lanes and the general purpose lanes. Limits of the transition areas approaching the end of the Express Lanes are defined upstream by the termination of solid striping used to delineate the separation between the Express Lanes and the general purpose lanes and the beginning of the downstream HOV access restriction.

The transition areas are anticipated to operate at a level similar to the level expected for the HOV and/or general purpose lanes in the vicinity of the transition area. The northbound transition area on I-405 from I-605 to the end of the HOV access is expected to operate at LOS F in year 2040. As shown in **Table 4.6-8**, the northbound GP and HOV lanes in the transition area on I-405 from I-605 to the end of the HOV access are anticipated to operate at LOS F for the GP lanes and/or HOV lanes.

The northbound transition area on I-605 from the termination of the direct connector separation to the end of the HOV access is expected to operate at LOS B and C during the AM and PM peak hours, respectively. **Table 4.6-8** shows that this segment of I-605 northbound is expected to operate at LOS B and C in the general purpose lanes during the AM and PM peak hours, respectively. In the southbound direction the transition area is expected to operate at LOS D during the AM and PM peak hours.

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4-37

Orange County Transportation Authority

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Generally, the transition areas are anticipated to operate at a level similar to the level expected for the HOV and/or general purpose lanes in the vicinity of the transition area. Overall, the transition areas are not expected to degrade operations of the HOV system adjacent to the transition areas.

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4-38

Orange County Transportation Authority

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

No.	Location		Traffic Control/Comments	Existing (2009) LOS					
	East/West Street	North/South Street		AM Peak Hour			PM Peak Hour		
				V/C	Avg Delay (sec)	LOS	V/C	Avg Delay (sec)	LOS
1	Carson St	I-405 SB Off Ramp	Existing Traffic Signal	0.58	21.9	C	0.61	17.8	B
2	Carson St	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.15	--	--	0.25	--	--
		I-405 SB Loop On Ramp	Unsignalized On Ramp	0.24	--	--	0.20	--	--
		I-405 NB Off Ramp	Existing Traffic Signal	0.55	14.8	B	0.66	12.4	B
3	Carson St	I-405 NB Loop On Ramp	Unsignalized On Ramp	0.23	--	--	0.45	--	--
		I-405 NB Direct On Ramp	Unsignalized On Ramp	0.40	--	--	0.32	--	--
		Pioneer Blvd	Existing Traffic Signal	0.76	48.1	D	0.76	55.1	D
5	Spring St/Cerritos Ave	I-405 SB Off Ramp	Existing Traffic Signal	0.79	26.2	C	0.60	18.4	B
6	Spring St/Cerritos Ave	I-405 NB On Ramp	Existing Traffic Signal	0.84	13.5	B	0.81	11.1	B
7	I-405 NB Direct On Ramp	I-405 NB Direct On Ramp	Unsignalized Off Ramp	0.35	--	--	0.34	--	--
		I-405 NB Direct On Ramp	Unsignalized On Ramp	0.22	--	--	0.21	--	--
		I-405 NB Loop Off Ramp	Unsignalized Off Ramp	0.19	--	--	0.18	--	--
		I-405 NB Loop On Ramp	Unsignalized On Ramp	0.50	--	--	0.38	--	--
8	I-405 SB Direct Off Ramp	I-405 SB Direct Off Ramp	Unsignalized On Ramp	0.19	--	--	0.23	--	--
		Lakewood Blvd	Unsignalized Off Ramp	0.40	--	--	0.31	--	--
9	Willow St	Lakewood Blvd	Existing Traffic Signal	0.76	31.1	C	0.92	66.2	E
10	Willow St	I-405 SB Loop Off Ramp	Unsignalized Off Ramp	0.32	--	--	0.30	--	--
		I-405 SB Direct On Ramp	Unsignalized On Ramp	0.26	--	--	0.38	--	--
		I-405 NB Off Ramp	Existing Traffic Signal	0.43	9.3	A	0.48	11.9	B
11	I-405 NB Loop On Ramp	I-405 NB Loop On Ramp	Unsignalized On Ramp	0.49	--	--	0.35	--	--
		Bellflower Blvd	Unsignalized On Ramp	0.28	--	--	0.18	--	--
12	Willow St	Bellflower Blvd	Existing Traffic Signal	0.84	81.2	F	0.92	40.1	D
13	Los Coyotes Diagonal	Bellflower Blvd	Existing Traffic Signal	0.63	31.3	C	0.97	72.8	E
		I-405 SB Direct On Ramp	Unsignalized On Ramp	0.06	--	--	0.09	--	--
14	I-405 SB Loop Off Ramp	Bellflower Blvd	Unsignalized On Ramp	0.12	--	--	0.26	--	--
15	Los Coyotes Diagonal	I-405 SB Direct Off Ramp	Existing Traffic Signal	0.44	14.4	B	0.45	13.4	B
		I-405 SB Loop On Ramp	Unsignalized On Ramp	0.14	--	--	0.13	--	--
16	Willow St	Los Coyotes Diagonal	Existing Traffic Signal	0.72	51.5	D	0.74	102.8	F
17	Willow St	Woodruff Ave	Existing Traffic Signal	1.07	86.8	F	0.77	30.4	C
18	I-405 NB Direct Off Ramp	Woodruff Ave	Unsignalized Off Ramp	0.15	--	--	0.17	--	--
		I-405 NB Direct On Ramp	Unsignalized On Ramp	0.25	--	--	0.20	--	--
		I-405 SB Direct Off Ramp	Unsignalized Off Ramp	0.48	--	--	0.38	--	--
19	I-405 SB Direct Off Ramp	Woodruff Ave	Unsignalized On Ramp	0.27	--	--	0.19	--	--
		I-405 SB Direct On Ramp	Existing Traffic Signal	0.54	11.3	B	0.45	13.7	B
		I-405 NB Loop On Ramp	Unsignalized On Ramp	0.11	--	--	0.20	--	--
20	I-405 NB Loop On Ramp	Palo Verde	Existing Traffic Signal	0.87	86.6	F	0.59	21.3	C
21	Woodruff Ave	Palo Verde	Existing Traffic Signal	0.73	19.4	B	0.75	25.2	C
22	Stearns St	Palo Verde	Existing Traffic Signal	0.28	--	--	0.39	--	--
23	Stearns St	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.50	4.0	A	0.55	4.3	A
24	I-405 NB Direct On Ramp	Studebaker Rd	Existing Traffic Signal	0.15	13.8	B	0.04	10.8	B
25	I-405 SB Direct Off Ramp	Studebaker Rd	Unsignalized Intersection	0.46	9.2	A	0.74	23.3	C
26	Atherton St	Studebaker Rd	Existing Traffic Signal	0.49	16.0	B	0.74	22.1	C
27	SR-22 WB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.72	17.6	B	0.82	17.1	B
28	SR-22 EB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.39	18.8	C	0.65	59.9	F
29	SR-22 WB On/Off Ramp	College Park Dr	Unsignalized Intersection	0.95	92.9	F	1.03	82.6	F
30	7th St	Pacific Coast Highway	Existing Traffic Signal	1.03	73.6	E	0.91	90.3	F
31	7th St	Bellflower Blvd	Existing Traffic Signal	0.47	22.3	C	0.73	22.5	C
32	Pacific Coast Highway	Channel Dr	Existing Traffic Signal	0.72	32.9	C	0.88	30.3	C
33	7th St	W. Campus Dr	Existing Traffic Signal	0.83	112.9	F	0.72	31.1	C
34	7th St	E. Campus Dr	Existing Traffic Signal	0.97	23.1	C	0.73	24.7	C

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

No.	Location		Movement	Available Storage (ft)	Existing (2009) Conditions			
	East/West Street	North/South Street			AM Peak Hour		PM Peak Hour	
					95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
1	Carson St	I-405 SB Off Ramp	SBL	300	168	Yes	255	Yes
			SBT	1,130	128	Yes	180	Yes
			SBR	300	273	Yes	225	Yes
3	Carson St	I-405 NB Off Ramp	NBL	300 (650)	165	Yes	144	Yes
			NBR	300(1175)	178	Yes	207	Yes
			NBL	120	364	No	296	No
			SBL	140	99	Yes	63	Yes
	Carson St	Pioneer Blvd	SBR	140	80	Yes	61	Yes
			EBL	250	214	Yes	251	No
			WBL	80	17	Yes	17	Yes
5	Spring St/Cerritos Ave	I-405 SB Off Ramp	SBL	220 (1240)	250	Yes	274	Yes
			SBR	300	482	Yes	314	Yes
6	Spring St/Cerritos Ave	I-405 NB On Ramp	WBL	250	247	Yes	258	Yes
			NBL	180	91	Yes	51	Yes
			SBL	130	48	Yes	125	Yes
9	Willow St	Lakewood Blvd	EBL	175	70	Yes	151	Yes
			WBL	150	35	Yes	80	Yes
			WBL	1,870	123	Yes	184	Yes
11	I-405 NB Off Ramp	Bellflower Blvd	WBL/T/R	1,130	71	Yes	146	Yes
			WBR	410	47	Yes	80	Yes
			NBL	150	325	No	172	Yes
12	Willow St	Bellflower Blvd	SBL	120	109	Yes	125	No
			EBL	140	158	No	280	No
			WBL	110	160	No	128	No
			NBL	160	23	Yes	61	Yes
13	Los Coyotes Diagonal	Bellflower Blvd	NBR	230	49	Yes	244	No
			EBL	190	222	No	307	No
			WBL	250	134	Yes	245	No
15	Los Coyotes Diagonal	I-405 SB Direct Off Ramp	SBL	1525 (500)	238	Yes	240	Yes
			SBL	120	18	Yes	21	Yes
			FBL	140	151	No	307	No
			WBL	160	378	No	452	No
			NBL	140	190	No	118	Yes
			NBR	60	31	Yes	22	Yes
			SBL	120	298	No	109	Yes
			SBR	120	61	Yes	36	Yes
			EBL	200	170	Yes	129	Yes
			WBL	180	370	No	284	No
20	I-405 NB Direct Off Ramp	Palo Verde	WBL	550	220	Yes	335	Yes
			WBL/T/R	1,155	53	Yes	55	Yes
			EBL	335	272	Yes	201	Yes
21	Woodruff Ave	Palo Verde	EBR	335	735	No	408	No
			NBL	130	104	Yes	132	No
			SBL	120	138	No	896	No
			FBL	90	101	No	158	No
			WBL	80	80	No	57	Yes
24	I-405 NB Direct On Ramp	Studebaker Rd	NRL	100	95	Yes	124	No
			SBR	70	19	Yes	16	Yes

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Orange County Transportation Authority

DRAFT

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

No.	Location		Movement	Available Storage (ft)	Existing (2009) Conditions			
	East/West Street	North/South Street			AM Peak Hour		PM Peak Hour	
					95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
26	Atherton St	Studebaker Rd	NBL	200	49	Yes	54	Yes
			SBL	260	4	Yes	10	Yes
			SBR	70	60	Yes	47	Yes
			EBL	120	106	Yes	410	No
			WBL	220	40	Yes	31	Yes
27	SR-32 WB On/Off Ramp	Studebaker Rd	NBR	150	31	Yes	20	Yes
			SBL	200	55	Yes	76	Yes
28	SR-32 EB On/Off Ramp	Studebaker Rd	NBR	300	453	No	430	No
			SBL	150	139	Yes	94	Yes
			WBR	60	22	Yes	24	Yes
30	7th St	Pacific Coast Highway	NBL	330	187	Yes	259	Yes
			SBL	230	195	Yes	285	Yes
31	7th St	Bellflower Blvd	NBR	130	108	Yes	136	No
			SBL	160	125	Yes	255	No
			SBR	160	86	Yes	400	No
			EBL	200	390	No	321	No
			WBL	200	53	Yes	120	Yes
32	Pacific Coast Highway	Bellflower Blvd	NBL	280	114	Yes	88	Yes
			SBL	240	22	Yes	16	Yes
			SBR	60	1	Yes	0	Yes
			EBL	110	4	Yes	60	Yes
			WBL	120	42	Yes	234	No
33	7th St	Channel Dr	WBR	200	46	Yes	45	Yes
			EBL	270	203	Yes	33	Yes
			SBR	180	2	Yes	14	Yes
34	7th St	W. Campus Dr	WBL	280	82	Yes	371	No
			SBL/R	150	52	Yes	205	No
			EBL	400	261	Yes	126	Yes
35	7th St	E. Campus Dr	SBL	150	79	Yes	208	No
			SBL/R	150	70	Yes	142	Yes
			EBL	150	172	No	113	Yes
			WBL	300	76	Yes	109	Yes

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Location	Lane Type	Direction	Mainline		Existing (2009) Conditions							
			Lanes	Capacity ¹	AM Peak Hour				PM Peak Hour			
					Traffic Demand Volume ²	V/C	Density ³	LOS ⁴	Traffic Demand Volume ²	V/C	Density ³	LOS ⁵
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Wilcox Street	GP	NB	5	9,400	9,795	1.05	43.7	E	8,666	0.94	35.8	D
		SB	5	9,250	8,199	0.93	32.6	D	8,322	0.90	34.4	D
	HOV	NB	1	5,650	1,748	1.06	—	—	1,222	0.74	—	—
		SB	1	5,650	778	0.47	—	—	1,599	0.97	—	—
Lakewood Boulevard/Wilcox Street to Bellflower Boulevard	GP	NB	5	9,350	—	—	—	—	—	—	—	—
		SB	5	9,350	—	—	—	—	—	—	—	—
	HOV	NB	1	5,650	1,748	1.06	—	—	1,222	0.74	—	—
		SB	1	5,650	778	0.47	—	—	1,598	0.97	—	—
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	9,250	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—
	HOV	NB	1	5,650	5,729	1.04	—	—	1,182	0.77	—	—
		SB	1	5,650	789	0.47	—	—	1,570	0.95	—	—
Woodruff Avenue to Palo Verde Avenue/Steams Street	GP	NB	5	9,250	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—
	HOV	NB	1	5,650	7,927	1.07	39.7	E	7,175	0.97	27.9	E
		SB	1	5,650	1,719	1.04	—	—	1,182	0.72	—	—
Palo Verde Avenue/Steams Street to Studebaker Road	GP	NB	5	9,250	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—
	HOV	NB	1	5,650	1,720	1.04	—	—	1,182	0.72	—	—
		SB	1	5,650	850	0.50	—	—	1,520	0.92	—	—
Studebaker Road to I-605 NB Off Ramp	GP	NB	4	7,400	7,240	0.98	38.2	F	6,033	0.81	26.9	D
		SB	5	9,250	7,884	0.85	28.6	D	7,738	0.84	31.9	D
	HOV	NB	1	5,650	1,360	0.84	—	—	1,440	0.87	—	—
		SB	1	5,650	850	0.50	—	—	1,520	0.95	—	—
I-605 NB Off Ramp to 7th St Off Ramp	GP	NB	4	7,400	7,240	0.98	38.2	F	6,033	0.81	26.9	D
		SB	4	7,400	6,500	0.88	27.7	D	5,418	0.87	38.1	D
	HOV	NB	1	5,650	1,360	0.84	—	—	1,440	0.87	—	—
		SB	1	5,650	850	0.50	—	—	1,520	0.95	—	—
7th St Off Ramp to I-605 SB On Ramp	GP	NB	4	7,400	7,240	0.98	38.2	F	6,033	0.81	26.9	D
		SB	4	7,400	6,120	0.87	27.3	D	5,860	0.88	32.5	D
	HOV	NB	1	5,650	1,380	0.84	—	—	1,440	0.87	—	—
		SB	1	5,650	850	0.50	—	—	1,520	0.95	—	—
I-605 Mainline												
Carson Street to HOV Transition	GP	NB	4	7,400	5,897	0.82	24.8	D	7,162	0.97	25.7	E
		SB	2	7,400	8,568	1.09	41.1	F	7,417	1.00	30.1	E
	HOV	NB	1	5,650	797	0.45	—	—	633	0.38	—	—
		SB	1	5,650	1,095	0.53	—	—	707	0.43	—	—
HOV Transition to Spring Street	GP	NB	4	7,400	5,897	0.81	24.8	D	7,162	0.97	25.7	E
		SB	5	9,250	8,056	0.87	27.9	D	7,417	0.90	28.6	D
	HOV	NB	1	5,650	797	0.45	—	—	633	0.38	—	—
		SB	1	5,650	—	—	—	—	—	—	—	—
Spring Street to Willow Street/Katella Avenue	GP	NB	4	7,400	5,853	0.72	21.9	C	6,458	0.87	27.2	D
		SB	4	7,400	7,442	1.01	34.9	D	6,787	0.93	29.2	D
	HOV	NB	1	5,650	787	0.45	—	—	633	0.38	—	—
		SB	1	5,650	—	—	—	—	—	—	—	—
Willow Street/Katella Avenue CD Road On Ramp to I-605	GP	NB	5	9,250	8,350	0.68	20.7	C	6,540	0.71	23.7	C
		SB	4	7,400	6,233	0.85	27.5	D	5,080	0.79	28.0	D
	HOV	NB	1	5,650	427	0.26	—	—	694	0.42	—	—
		SB	1	5,650	—	—	—	—	—	—	—	—
7th Street Mainline												
Propper Tree Lane to Studebaker Road	GP	EB	2	3,700	3,359	0.81	17.9	D	3,878	1.06	20.7	C
		WB	3	5,650	3,407	0.61	18.2	C	1,985	0.56	10.6	A
Studebaker Road to I-605	GP	EB	2	3,700	3,359	0.81	17.9	D	3,878	1.06	20.7	C
		WB	3	5,650	4,604	1.08	38.3	F	3,180	0.89	27.3	D

Notes:

1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).

2. Density is shown in passenger cars/mile/lane (pcu/mi/ln).

3. Level of Service (LOS): General Purpose (GP) lane LOS is based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS E.

4. Peak hour capacities for Freeway lanes include 2,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.

5. * Density is in excess of 45 pcu/mi/ln; therefore LOS is F.

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GL-9 (Continued)

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I-405 Improvement Project Supplemental Traffic Study Long Beach Area Traffic Study

Table 4.2-4: Existing (Year 2009) Ramp Junction Peak Hour Level of Service											
Interchange	Ramp Type	Ramp Lanes	Ramp Capacity	Existing (Year 2009) Conditions							
				AM Peak				PM Peak			
				Traffic Volume ¹	V/C	Density ²	LOS ^{3,4}	Traffic Volume ¹	V/C	Density ²	LOS ^{3,5}
1-405 Ramp Junctions											
Lakewood Blvd & Willow St	NB Off Direct	2	3,000	808	0.27	13.2	B	779	0.26	11.0	B
	NB On Loop	1	1,500	754	0.50	47.7	F	555	0.38	43.1	F
	NB On Direct	1	1,500	323	0.22	26.3	C	319	0.21	23.0	C
	SB Off (Direct + Loop)	2	3,000	1,079	0.36	16.3	B	918	0.31	13.3	B
	SB On Loop	1	1,500	287	0.19	40.5	F	343	0.23	36.9	F
Bellflower Blvd & Los Coyotes Diagonal	SB On Direct (from Willow St)	1	1,500	393	0.26	21.0	C	567	0.38	39.7	B
	NB Off Direct	1	1,500	303	0.20	26.5	C	494	0.33	26.2	C
	NB On (Direct + Loop)	2	3,000	1,162	0.39	14.3	F	787	0.26	10.4	F
	SB Off (Direct + Loop)	2	3,000	1,358	0.45	15.7	B	2,021	0.67	19.5	B
	SB On (Direct + Loop)	1	1,500	804	0.34	33.4	D	1,326	0.88	29.6	D
Woodluff Ave	NB Off Direct	1	1,500	222	0.15	21.0	C	248	0.17	20.2	C
	NB On Direct	1	1,500	371	0.25	36.2	F	296	0.20	35.1	E
	SB Off Direct	1	1,500	724	0.48	27.3	C	572	0.38	24.3	C
	SB On Direct	1	1,500	400	0.27	22.5	C	279	0.19	21.6	C
	NB Off Direct	1	1,500	365	0.24	21.6	C	511	0.34	21.4	C
Palo Verde Ave & Stearn St	NB On Loop	1	1,500	168	0.11	52.4	F	304	0.20	49.3	F
	SB On Direct (from Stearn St)	1	1,500	417	0.28	24.8	C	583	0.39	23.1	C
	NB On Direct	1	1,500	288	0.19	53.1	F	315	0.21	51.0	F
	SB Off Direct	1	1,500	463	0.27	32.4	D	175	0.12	29.8	D
	SB Off Direct	1	1,500	88	0.05	30.6	D	128	0.09	30.5	D
7th St											

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I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.2-4: Existing (Year 2009) Ramp Junction Peak Hour Level of Service											
Interchange	Ramp Type	Ramp Lanes	Ramp Capacity ^{1,4}	Existing (Year 2009) Conditions				PM Peak			
				AM Peak		Ramp Junction		Ramp		Ramp Junction	
				Traffic Volume ¹	V/C	Density ²	LOS ^{3,5}	Traffic Volume ¹	V/C	Density ²	LOS ^{3,5}
1-405 Ramp Junctions											
Carson St	NB Off Direct	1	1,500	899	0.60	32.1	D	879	0.59	37.0	E
	NB On Loop	1	1,500	338	0.23	20.7	C	681	0.45	24.5	C
	NB On Direct	1	1,500	605	0.40	20.5	C	481	0.32	24.1	C
	SB Off Direct	2	3,000	1,395	0.47	16.2	B	1,674	0.56	17.3	B
	SB On Loop	1	1,500	366	0.24	23.2	C	301	0.20	21.7	C
Spring St/Cerritos Ave	SB On Direct	1	1,500	230	0.15	23.5	C	369	0.25	21.6	C
	NB On Loop	1	1,500	644	0.43	18.6	B	709	0.47	20.5	C
	SB Off Direct	1	1,500	1,663	1.11	39.2	E	1,337	0.89	35.2	E
	NB Off (Direct + Loop)	1	1,500	1,185	0.79	3.4	A	813	0.54	2.3	A
	NB On Direct	1	1,500	1,025	0.68	21.0	C	1,959	0.91	22.5	C
Willow St/Karela Ave	SB Off Direct	1	1,500	547	0.36	37.1	E	534	0.36	34.2	D
	SB Off Loop	1	1,500	1,204	0.80	38.3	E	1,073	0.72	34.9	D
	SB On Direct (Direct + Loop)	1	1,500	599	0.40	26.0	C	700	0.47	24.3	C
7th Street Ramp Junctions											
Studebaker Rd	EB Off Loop	1	1,500	51	0.03	36.0	E	65	0.04	41.1	F
	EB On Loop	1	1,500	1,296	0.86	42.5	F	1,311	0.87	47.1	F
	WB Off Loop	1	1,500	683	0.46	47.7	F	1,345	0.90	46.8	D
	WB On Loop	1	1,500	86	0.06	25.9	C	45	0.03	13.4	B

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Orange County Transportation Authority

GL-9 (Continued)

GL-9 (Continued)

Long Beach Area Traffic Study

Improvement Project Supplemental Traffic Study

Table 4.2-4: Existing (Year 2009) Ramp Junction Peak Hour Level of Service										
Interchange	Ramp Type	Ramp Lanes	Ramp Capacity ^{1,4}	Existing (Year 2009) Conditions						
				AM Peak			PM Peak			
				Ramp		Ramp Junction	Ramp		Ramp Junction	
				Traffic Volume ¹	V/C	Density ²	LOS ^{3,5}	Traffic Volume ¹	V/C	Density ²
Freeway - to - Freeway Branch Connectors ⁷										
I-405/I-605 Freeway Interchanges	I-605 SB to I-405 NB	1	1,800	848	0.47	--	--	1,056	0.61	--
	I-605 SB/7th St to I-405 NB	2	3,600	1,555	0.43	--	--	1,864	0.52	--
	I-405 SB to I-605 NB	2	3,600	1,375	0.38	--	--	1,305	0.36	--
	I-605 SB to 7th St/I-405 SB	2	3,600	5,442	1.51	--	--	4,784	1.33	--
	I-605 SB/I-405 SB to 7th St	1	1,800	1,754	0.97	--	--	1,280	0.71	--
	7th St to I-605 NB/I-405 NB	2	3,600	2,131	0.70	--	--	2,253	0.63	--
	7th St to I-405 NB	1	1,800	707	0.39	--	--	768	0.43	--

- Notes:
1. Peak hour capacity and traffic demand forecast volumes are shown in vehicles per hour (vph).
 2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
 3. Level of Service (LOS) is based on density (pc/mi/ln); D/C - demand-to-capacity ratio.
 4. Peak hour capacities for freeway ramps include 1,500 vph for each freeway ramp lane and 1,800 vph for each freeway-to-freeway branch connector lane.
 5. LOS for the total flow of the merge/diverge area exceeds the capacity of the freeway segment; the density is not applicable in this case.
 6. * Per Highway Capacity Manual, at the impact area of merge and diverge is primarily focused on an influence area of 1,500 ft; the density was not calculated for areas exceeding 1,500 ft in length.
 7. For freeway-to-freeway branch connectors, D/C ratios are provided.

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I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.2-5: Existing (Year 2009) Weaving Level-of-Service Freeway and Collector-Distributor Roads				
Weaving Segment	AM Peak Hour		PM Peak Hour	
	Density ¹	LOS ²	Density ¹	LOS ²
Freeway Mainline				
I-405 Southbound - Lakewood Boulevard/Willow Street to Bellflower Boulevard	42.0	E	61.6	F
I-405 Northbound - Bellflower Boulevard to Lakewood Boulevard/Willow Street	48.5	F	34.9	D
I-405 Southbound - Bellflower Boulevard to Woodruff Avenue	38.0	E	55.3	F
I-405 Northbound - Woodruff Avenue to Bellflower Boulevard	52.4	F	38.1	E
I-405 Northbound - Palo Verde Avenue/Stearns Street to Woodruff Avenue	44.6	F	32.6	D
I-405 Southbound - Palo Verde Avenue/Stearns Street to Studebaker Road	29.9	D	35.5	E
I-405 Northbound - Studebaker Road to Palo Verde Avenue/Stearns Street	40.6	E	34.3	D
Collector-Distributor (C-D) Roads				
Lakewood Boulevard/Willow Street Interchange at I-405				
Southbound C-D Road	19.6	B	20.4	C
Bellflower Boulevard/Los Coyotes Diagonal Interchange at I-405				
Southbound C-D Road	9.0	A	15.0	B

- Notes:
1. Density is shown in passenger cars/mile/lane (pc/mi/ln).
 2. Level of Service (LOS) is based on density (pc/mi/ln). The density LOS thresholds are different for the freeway mainline and collector-distributor roads.

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.3-1 No Build Alternative (Year 2020) Intersection Level of Service - AM/PM Peak Hours									
No.	Location		Traffic Control/Comments	No Build Alternative (Year 2020) LOS					
				AM Peak Hour			PM Peak Hour		
				D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS
1	Carson St	I-605 SB Off Ramp	Existing Traffic Signal	0.57	22.3	C	0.68	23.8	C
		I-605 SB Direct On Ramp	Unsignalized On Ramp	0.22	--	--	0.33	--	--
2	Carson St	I-605 SB Loop On Ramp	Unsignalized On Ramp	0.33	--	--	0.33	--	--
		I-605 NB Off Ramp	Existing Traffic Signal	0.59	21.8	C	0.76	20.6	C
		I-605 NB Loop On Ramp	Unsignalized On Ramp	0.31	--	--	0.35	--	--
3	Carson St	I-605 NB Direct On Ramp	Unsignalized On Ramp	0.52	--	--	0.49	--	--
4	Carson St	Pioneer Blvd	Existing Traffic Signal	0.79	31.1	C	0.84	33.7	C
5	Spring St/Cerritos Ave	I-605 SB Off Ramp	Existing Traffic Signal	0.68	14.2	B	0.65	10.9	B
6	Spring St/Cerritos Ave	I-605 NB On Ramp	Existing Traffic Signal	0.76	10.5	B	0.79	8.2	A
		I-405 NB Direct Off Ramp	Unsignalized Off Ramp	0.38	--	--	0.38	--	--
		I-405 NB Direct On Ramp	Unsignalized On Ramp	0.38	--	--	0.33	--	--
		I-405 NB Loop On Ramp	Unsignalized On Ramp	0.23	--	--	0.22	--	--
7		Lakewood Blvd	Unsignalized On Ramp	0.53	--	--	0.41	--	--
		I-405 SB Loop On Ramp	Unsignalized On Ramp	0.22	--	--	0.25	--	--
8	I-405 SB Direct Off Ramp	Lakewood Blvd	Unsignalized Off Ramp	0.48	--	--	0.48	--	--
9	Willow St	Lakewood Blvd	Existing Traffic Signal	0.75	31.2	C	0.89	43.0	D
		I-405 SB Loop On Ramp	Unsignalized On Ramp	0.35	--	--	0.46	--	--
		I-405 SB Direct On Ramp	Unsignalized On Ramp	0.28	--	--	0.41	--	--
10	Willow St	I-405 NB Off Ramp	Existing Traffic Signal	0.51	10.8	B	0.53	10.6	B
		I-405 NB Loop On Ramp	Unsignalized On Ramp	0.53	--	--	0.37	--	--
11	I-405 NB Direct On Ramp	Bellflower Blvd	Unsignalized On Ramp	0.31	--	--	0.19	--	--
12	Willow St	Bellflower Blvd	Existing Traffic Signal	1.01	48.8	D	1.01	54.4	D
		Bellflower Blvd	Existing Traffic Signal	0.65	26.4	C	1.00	42.1	D
13	Los Coyotes Diagonal	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.06	--	--	0.12	--	--
14	I-405 SB Loop Off Ramp	Bellflower Blvd	Unsignalized On Ramp	0.12	--	--	0.32	--	--
		I-405 SB Direct Off Ramp	Existing Traffic Signal	0.52	10.0	B	0.47	16.0	B
15	Los Coyotes Diagonal	I-405 SB Loop On Ramp	Unsignalized On Ramp	0.16	--	--	0.17	--	--
16	Willow St	Los Coyotes Diagonal	Existing Traffic Signal	0.78	44.4	D	1.02	35.1	D
17	Willow St	Woodruff Ave	Existing Traffic Signal	1.33	147.9	F	0.87	40.4	D
		I-405 NB Direct Off Ramp	Unsignalized Off Ramp	0.39	--	--	0.19	--	--
18	I-405 NB Direct On Ramp	Woodruff Ave	Unsignalized On Ramp	0.31	--	--	0.21	--	--
		I-405 SB Direct Off Ramp	Unsignalized Off Ramp	0.52	--	--	0.47	--	--
19	I-405 SB Direct On Ramp	Woodruff Ave	Unsignalized On Ramp	0.41	--	--	0.23	--	--
		I-405 NB Direct Off Ramp	Existing Traffic Signal	0.78	17.7	B	0.61	11.8	B
20	I-405 NB Loop On Ramp	Palo Verde	Unsignalized On Ramp	0.13	--	--	0.22	--	--
21	Woodruff Ave	Palo Verde	Existing Traffic Signal	0.84	13.6	B	0.66	10.3	B
22	Stearns St	Palo Verde	Existing Traffic Signal	0.85	18.9	B	0.88	20.5	C
23	Stearns St	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.30	--	--	0.46	--	--
24	I-405 NB Direct On Ramp	Studebaker Rd	Existing Traffic Signal	0.51	2.6	A	0.47	4.7	A
25	I-405 SB Direct Off Ramp	Studebaker Rd	Unsignalized Intersection	0.86	68.4	F	0.34	15.2	C
26	Atherton St	Studebaker Rd	Existing Traffic Signal	0.54	9.3	A	0.78	13.8	B
27	SR-22 WB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.46	12.8	B	0.79	28.0	C
28	SR-22 EB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.91	21.3	C	0.99	25.8	C
29	SR-22 WB On/Off Ramp	College Park Dr	Unsignalized Intersection	0.43	21.3	C	0.61	88.7	F
30	7th St	Pacific Coast Highway	Existing Traffic Signal	0.94	49.2	D	0.95	35.9	D
31	7th St	Bellflower Blvd	Existing Traffic Signal	1.04	68.9	F	0.98	47.9	D
32	Pacific Coast Highway	Bellflower Blvd	Existing Traffic Signal	0.53	38.8	D	0.70	20.4	C
33	7th St	Channel Dr	Existing Traffic Signal	0.71	24.5	C	0.94	22.7	C
34	7th St	W. Campus Dr	Existing Traffic Signal	0.79	31.2	C	0.81	32.0	C
35	7th St	E. Campus Dr	Existing Traffic Signal	1.03	35.8	D	0.87	14.6	B

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.3-2 No Build Alternative (Year 2020) Intersection Queues vs Storage - AM/PM Peak Hours								
No.	Location		Movement	Available Storage (ft)	2020 No Build Alternative Conditions			
	East/West Street	North/South Street			AM Peak Hour		PM Peak Hour	
					95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
1	Carson St	I-605 SB Off Ramp	SBL	300	229	Yes	341	No
SBR			1,130	122	Yes	163	Yes	
SRR			300	237	Yes	171	Yes	
3	Carson St	I-605 NB Off Ramp	NBL	300 (650)	225	Yes	291	Yes
NBR			300 (1175)	193	Yes	125	Yes	
NBL			120	245	No	271	No	
4	Carson St	Pioneer Blvd	SBL	140	78	Yes	76	Yes
			SBR	140	73	Yes	83	Yes
			EBL	250	271	No	406	No
			WBL	80	17	Yes	18	Yes
5	Spring St/Cerritos Ave	I-605 SB Off Ramp	SBL	220 (1240)	268	Yes	165	Yes
			SBR	900	0	Yes	0	Yes
6	Spring St/Cerritos Ave	I-605 NB On Ramp	WBL	260	246	Yes	174	Yes
			NBL	180	135	Yes	113	Yes
			SBL	150	47	Yes	87	Yes
			EBL	175	68	Yes	93	Yes
			WBL	150	42	Yes	151	No
			WBL	1,870	97	Yes	175	Yes
11	I-405 NB Off Ramp	Bellflower Blvd	WBL/T/R	1,130	70	Yes	171	Yes
			WBR	410	63	Yes	155	Yes
			NBL	150	366	No	130	Yes
12	Willow St	Bellflower Blvd	SBL	120	142	No	96	Yes
EBL			240	215	No	351	No	
WBL			110	127	No	267	No	
NBL			160	22	Yes	39	Yes	
13	Los Coyotes Diagonal	Bellflower Blvd	NBR	230	49	Yes	161	Yes
			EBL	190	323	No	539	No
			WBL	150	207	No	255	No
			SBL	1525 (500)	144	Yes	259	Yes
16	Willow St	Los Coyotes Diagonal	SBL	120	156	No	233	No
			EBL	140	144	No	79	Yes
			WBL	160	328	No	586	No
			NBL	140	670	No	287	No
17	Willow St	Woodruff Ave	NBR	60	33	Yes	17	Yes
			SBL	120	132	No	59	Yes
			SBR	120	151	No	53	Yes
			EBL	200	268	No	204	No
			WBL	180	247	No	180	No
			WBL	550	401	Yes	266	Yes
20	I-405 NB Direct Off Ramp	Palo Verde	WBT/R	1,155	60	Yes	141	Yes
21	Woodruff Ave	Palo Verde	EBL	335	318	Yes	209	Yes
			EBR	335	228	Yes	190	Yes
			NBL	130	174	No	172	No
22	Stearns St	Palo Verde	SBL	120	89	Yes	161	No
			EBL	90	205	No	171	No
			WBL	80	38	Yes	118	No
24	I-405 NB Direct On Ramp	Studebaker Rd	NBL	100	53	Yes	78	Yes
			SBR	70	12	Yes	23	Yes

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.3-2 No Build Alternative (Year 2020) Intersection Queues vs Storage - AM/PM Peak Hours								
No	Location		Movement	Available Storage (ft)	2020 No Build Alternative Conditions			
	East/West Street	North/South Street			AM Peak Hour		PM Peak Hour	
					95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
26	Atherton St	Studebaker Rd	NBL	200	42	Yes	50	Yes
			SBL	260	1	Yes	2	Yes
			SBR	70	20	Yes	6	Yes
			EBL	120	77	Yes	222	No
			WBL	220	29	Yes	24	Yes
27	SR-22 WB On/Off Ramp	Studebaker Rd	NBR	150	14	Yes	20	Yes
			SBL	200	68	Yes	169	Yes
28	SR-22 EB On/Off Ramp	Studebaker Rd	NBR	300	1069	No	970	No
			SBL	150	331	No	318	No
			WBR	60	44	Yes	119	No
30	7th St	Pacific Coast Highway	NBL	330	172	Yes	292	Yes
			SBL	290	253	Yes	338	No
31	7th St	Bellflower Blvd	NBR	130	120	Yes	47	Yes
			SBL	160	195	No	243	No
			SBR	160	80	Yes	277	No
			EBL	200	419	No	400	No
			WBL	200	39	Yes	71	Yes
32	Pacific Coast Highway	Bellflower Blvd	NBL	280	92	Yes	73	Yes
			SBL	240	258	No	212	Yes
			SBR	60	17	Yes	36	Yes
			EBL	110	53	Yes	100	Yes
			WBL	120	56	Yes	64	Yes
33	7th St	Channel Dr	WBR	200	64	Yes	41	Yes
			EBL	270	109	Yes	28	Yes
			SBR	180	23	Yes	6	Yes
34	7th St	W. Campus Dr	WBL	280	107	Yes	264	Yes
			SBL/R	150	67	Yes	213	No
35	7th St	E. Campus Dr	EBL	400	88	Yes	3	Yes
			SBL	150	76	Yes	183	No
			SBL/R	150	68	Yes	108	Yes
			EBL	150	207	No	99	Yes
			WBL	300	74	Yes	131	Yes

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.3-3 No Build Alternative (Year 2040) Intersection Level of Service - AM/PM Peak Hours										
No.	Location		Traffic Control/Comments	No Build Alternative (Year 2040) LOS						
	East/West Street	North/South Street		AM Peak Hour			PM Peak Hour			
				D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS	
1	Carson St	I-605 SB Off Ramp	Existing Traffic Signal	0.62	22.4	C	0.73	24.5	C	
2	Carson St	I-605 SB Direct On Ramp	Unsignalized On Ramp	0.24	--	--	0.36	--	--	
		I-605 SB Loop On Ramp	Unsignalized On Ramp	0.35	--	--	0.36	--	--	
		I-605 NB Off Ramp	Existing Traffic Signal	0.63	23.6	C	0.82	23.2	C	
3	Carson St	I-605 NB Loop On Ramp	Unsignalized On Ramp	0.33	--	--	0.37	--	--	
		I-605 NB Direct On Ramp	Unsignalized On Ramp	0.56	--	--	0.53	--	--	
		Pioneer Blvd	Existing Traffic Signal	0.86	35.1	D	0.92	43.9	D	
4	Spring St/Cerritos Ave	I-605 SB Off Ramp	Existing Traffic Signal	0.74	15.4	B	0.71	12.0	B	
6	Spring St/Cerritos Ave	I-605 NB On Ramp	Existing Traffic Signal	0.82	11.6	B	0.86	9.8	A	
7	I-405 NB Direct Off Ramp	Lakewood Blvd	Unsignalized Off Ramp	0.41	--	--	0.41	--	--	
			I-405 NB Direct On Ramp	Unsignalized On Ramp	0.41	--	--	0.25	--	--
			I-405 NB Loop Off Ramp	Unsignalized Off Ramp	0.25	--	--	0.23	--	--
			I-405 NB Loop On Ramp	Unsignalized On Ramp	0.57	--	--	0.44	--	--
8	I-405 SB Direct Off Ramp	Lakewood Blvd	Unsignalized On Ramp	0.24	--	--	0.27	--	--	
			Unsignalized Off Ramp	0.46	--	--	0.52	--	--	
9	Willow St	Lakewood Blvd	Existing Traffic Signal	0.81	33.6	C	0.93	48.4	D	
10	Willow St	I-405 SB Loop Off Ramp	Unsignalized Off Ramp	0.37	--	--	0.50	--	--	
		I-405 SB Direct On Ramp	Unsignalized On Ramp	0.31	--	--	0.44	--	--	
		I-405 NB Off Ramp	Existing Traffic Signal	0.55	11.6	B	0.58	11.3	B	
11	I-405 NB Loop On Ramp	Bellflower Blvd	Unsignalized On Ramp	0.57	--	--	0.40	--	--	
			Unsignalized On Ramp	0.33	--	--	0.20	--	--	
12	Willow St	Bellflower Blvd	Existing Traffic Signal	1.09	67.3	E	1.09	70.6	E	
13	Los Coyotes Diagonal	Bellflower Blvd	Existing Traffic Signal	0.70	26.9	C	1.13	56.8	E	
			I-405 SB Direct On Ramp	Unsignalized On Ramp	0.07	--	--	0.13	--	--
			I-405 SB Loop Off Ramp	Unsignalized On Ramp	0.13	--	--	0.34	--	--
15	Los Coyotes Diagonal	Bellflower Blvd	I-405 SB Direct Off Ramp	Existing Traffic Signal	0.58	10.6	B	0.51	18.8	B
			I-405 SB Loop On Ramp	Unsignalized On Ramp	0.18	--	--	0.18	--	--
16	Willow St	Los Coyotes Diagonal	Existing Traffic Signal	0.87	48.8	D	1.18	45.4	D	
17	Willow St	Woodruff Ave	Existing Traffic Signal	1.44	180.5	F	0.94	51.5	D	
18	I-405 NB Direct Off Ramp	Woodruff Ave	Unsignalized Off Ramp	0.42	--	--	0.20	--	--	
			Unsignalized On Ramp	0.34	--	--	0.23	--	--	
			Unsignalized Off Ramp	0.56	--	--	0.51	--	--	
19	I-405 SB Direct Off Ramp	Woodruff Ave	Unsignalized On Ramp	0.45	--	--	0.25	--	--	
			Existing Traffic Signal	0.96	21.2	C	0.70	12.6	B	
20	I-405 NB Loop On Ramp	Palo Verde	Unsignalized On Ramp	0.14	--	--	0.23	--	--	
21	Woodruff Ave	Palo Verde	Existing Traffic Signal	0.91	15.9	B	0.72	11.3	B	
22	Stearns St	Palo Verde	Existing Traffic Signal	0.94	22.0	C	0.92	24.4	C	
23	Stearns St	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.33	--	--	0.50	--	--	
24	I-405 NB Direct On Ramp	Studebaker Rd	Existing Traffic Signal	0.55	2.8	A	0.51	4.9	A	
25	I-405 SB Direct Off Ramp	Studebaker Rd	Unsignalized Intersection	1.02	98.3	F	0.33	15.7	C	
26	Atherton St	Studebaker Rd	Existing Traffic Signal	0.60	10.7	B	0.85	15.7	B	
27	SR-22 WB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.50	13.1	B	0.86	30.4	C	
28	SR-22 EB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.99	30.4	C	1.03	37.1	D	
29	SR-22 WB On/Off Ramp	College Park Dr	Unsignalized Intersection	0.51	25.3	D	0.84	152.1	F	
30	7th St	Pacific Coast Highway	Existing Traffic Signal	1.02	65.8	E	1.03	58.7	E	
31	7th St	Bellflower Blvd	Existing Traffic Signal	1.13	82.4	F	1.06	63.0	E	
32	Pacific Coast Highway	Bellflower Blvd	Existing Traffic Signal	0.57	39.1	D	0.82	32.1	C	
33	7th St	Channel Dr	Existing Traffic Signal	0.77	25.7	C	1.02	50.8	D	
34	7th St	W. Campus Dr	Existing Traffic Signal	0.85	53.1	D	0.87	58.5	E	
35	7th St	E. Campus Dr	Existing Traffic Signal	1.12	55.8	E	0.96	16.7	B	

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

No.	Location		Movement	Available Storage (ft)	2040 No Build Alternative Conditions			
					AM Peak Hour		PM Peak Hour	
	East/West Street	North/South Street			95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
1	Carson St	I-605 SB Off Ramp	SBL	300	252	Yes	379	No
			SBT	1,130	134	Yes	178	Yes
			SBR	300	263	Yes	187	Yes
3	Carson St	I-605 NB Off Ramp	NBL	300 (650)	246	Yes	319	Yes
			NBR	300 (1,175)	214	Yes	135	Yes
			NBL	120	270	No	299	No
4	Carson St	Pioneer Blvd	SBL	140	84	Yes	82	Yes
			SBR	140	76	Yes	85	Yes
			EBL	250	303	No	431	No
			WBL	80	17	Yes	18	Yes
			SBL	220 (1,240)	283	Yes	175	Yes
5	Spring St/Cerritos Ave	I-605 SB Off Ramp	SBR	900	0	Yes	0	Yes
			WBL	260	287	No	191	Yes
6	Spring St/Cerritos Ave	I-605 NB On Ramp	NBL	180	150	Yes	155	Yes
			SBL	150	52	Yes	101	Yes
9	Willow St	Lakewood Blvd	EBL	175	78	Yes	100	Yes
			WBL	150	45	Yes	163	No
			WBL	1,870	106	Yes	185	Yes
11	I-405 NB Off Ramp	Bellflower Blvd	WBL/T/R	1,130	83	Yes	198	Yes
			WBR	410	75	Yes	173	Yes
			NBL	150	403	No	129	Yes
12	Willow St	Bellflower Blvd	SBL	120	157	No	98	Yes
			EBL	140	234	No	388	No
			WBL	110	139	No	274	No
13	Los Coyotes Diagonal	Bellflower Blvd	NBL	160	24	Yes	43	Yes
			NBR	230	51	Yes	202	Yes
			EBL	190	347	No	589	No
			WBL	150	218	No	277	No
15	Los Coyotes Diagonal	I-405 SB Direct Off Ramp	SBL	1525 (500)	154	Yes	275	Yes
			SBL	120	185	No	272	No
16	Willow St	Los Coyotes Diagonal	EBL	140	155	No	79	Yes
			WBL	160	358	No	645	No
			NBL	140	739	No	318	No
17	Willow St	Woodruff Ave	NBR	60	35	Yes	17	Yes
			SBL	120	141	No	63	Yes
			SBR	120	170	No	62	Yes
			EBL	200	288	No	225	No
			WBL	180	272	No	196	No
20	I-405 NB Direct Off Ramp	Palo Verde	WBL	550	447	Yes	300	Yes
			WBL/T/R	1,155	74	Yes	170	Yes
21	Woodruff Ave	Palo Verde	EBL	335	356	No	280	Yes
			EBR	335	274	Yes	273	Yes
22	Stearns St	Palo Verde	NBL	130	189	No	188	No
			SBL	120	88	Yes	155	No
			EBL	90	229	No	191	No
			WBL	80	40	Yes	134	No
24	I-405 NB Direct On Ramp	Studebaker Rd	NBL	100	53	Yes	77	Yes
			SBR	70	12	Yes	26	Yes

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

No.	Location		Movement	Available Storage (ft)	2040 No Build Alternative Conditions			
					AM Peak Hour		PM Peak Hour	
	East/West Street	North/South Street			95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
26	Atherton St	Studebaker Rd	NBL	200	86	Yes	61	Yes
			SBL	250	1	Yes	2	Yes
			SBR	70	29	Yes	6	Yes
			EBL	120	84	Yes	248	No
			WBL	220	30	Yes	26	Yes
27	SR-22 WB On/Off Ramp	Studebaker Rd	NBR	150	14	Yes	22	Yes
			SBL	200	74	Yes	186	Yes
28	SR-22 EB On/Off Ramp	Studebaker Rd	NBR	300	1244	No	1172	No
			SBL	150	359	No	396	No
			WBR	60	46	Yes	171	No
30	7th St	Pacific Coast Highway	NBL	330	162	Yes	324	Yes
			SBL	290	275	Yes	382	No
31	7th St	Bellflower Blvd	NBR	130	151	No	37	Yes
			SBL	160	228	No	267	No
			SBR	160	85	Yes	323	No
			EBL	200	435	No	372	No
			WBL	200	38	Yes	0	Yes
32	Pacific Coast Highway	Bellflower Blvd	NBL	280	98	Yes	75	Yes
			SBL	240	273	No	201	Yes
			SBR	60	17	Yes	35	Yes
			EBL	110	55	Yes	127	No
			WBL	120	67	Yes	72	Yes
33	7th St	Channel Dr	WBR	200	91	Yes	42	Yes
			EBL	270	112	Yes	24	Yes
34	7th St	W Campus Dr	EBR	180	20	Yes	61	Yes
			WBL	280	109	Yes	266	Yes
			SBL/T/R	150	73	Yes	232	No
35	7th St	E Campus Dr	EBL	400	90	Yes	29	Yes
			SBL	150	82	Yes	206	No
			SBL/T/R	150	71	Yes	127	Yes
			EBL	150	212	No	101	Yes
			WBL	300	78	Yes	144	Yes

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GL-9 (Continued)

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Location	Lane Type	Direction	No Build Alternative (Year 2020) Conditions									
			Mainline		No Build Alternative (Year 2020) Conditions							
			Lanes	Capacity ^{1,2}	AM Peak Hour				PM Peak Hour			
					Traffic Demand Volume ³	D/C	Density ⁴	LOS ⁵	Traffic Demand Volume ³	D/C	Density ⁴	LOS ⁵
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Wilow Street	GP	NB	5	9,250	9,540	1.03	41.5	E	9,810	1.06	41.3	F
		SB	5	9,250	9,770	1.05	30.5	F	10,090	1.09	30.4	F
	HOV	NB	1	1,850	1,860	1.01	--	--	2,150	1.16	--	--
		SB	1	1,850	1,820	0.98	--	--	1,960	1.05	--	--
Lakewood Boulevard/Wilow Street to Bellflower Boulevard	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	1,890	1.01	--	--	2,130	1.14	--	--
		SB	1	1,850	1,820	0.98	--	--	1,960	1.06	--	--
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	2,730	0.94	--	--	2,080	1.12	--	--
		SB	1	1,850	1,610	0.83	--	--	2,080	1.12	--	--
Woodruff Avenue to Palo Verde Avenue/Steam Street	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	4	7,400	8,640	1.15	--	--	8,750	1.19	--	--
	HOV	NB	1	1,850	1,730	0.94	--	--	2,080	1.12	--	--
		SB	1	1,850	2,060	1.11	--	--	1,950	1.08	--	--
Palo Verde Avenue/Steam Street to Studebaker Road	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table							
		SB	5	9,250	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	1,730	0.94	--	--	2,080	1.12	--	--
		SB	1	1,850	2,140	1.16	--	--	2,060	1.11	--	--
Studebaker Road to I-605 NB Off Ramp	GP	NB	4	7,400	8,600	1.16	--	--	9,560	1.23	--	--
		SB	5	9,250	8,550	0.92	29.7	D	9,090	0.98	36.5	E
	HOV	NB	1	1,850	2,490	1.35	--	--	2,790	1.51	--	--
		SB	1	1,850	2,140	1.16	--	--	2,060	1.11	--	--
I-605 NB Off Ramp to 7th St Off Ramp	GP	NB	1	7,400	6,910	0.93	39.9	E	7,940	1.07	41.0	E
		SB	4	7,400	7,150	0.97	31.8	D	7,830	1.05	48.7	E
	HOV	NB	1	1,850	2,490	1.35	--	--	2,790	1.51	--	--
		SB	1	1,850	2,140	1.16	--	--	2,060	1.11	--	--
7th St Off Ramp to I-605 SB On Ramp	GP	NB	4	7,400	6,830	0.93	39.9	E	7,140	1.07	41.0	E
		SB	4	7,400	7,250	0.95	31.1	D	7,690	1.04	43.3	E
	HOV	NB	1	1,850	2,490	1.35	--	--	2,790	1.51	--	--
		SB	1	1,850	2,140	1.16	--	--	2,060	1.11	--	--
I-605 Mainline												
Carson Street to Spring Street	GP	NB	4	7,400	9,090	0.90	38.8	C	7,420	1.00	37.9	E
		SB	4	7,400	7,550	1.06	27.7	F	7,280	0.96	35.0	D
	HOV	NB	1	1,850	1,530	0.82	--	--	1,900	1.03	--	--
		SB	1	1,850	1,940	1.05	--	--	1,740	0.94	--	--
Spring Street to Willow Street/Katella Avenue	GP	NB	4	7,400	9,120	0.89	36.9	C	6,330	0.86	46.6	D
		SB	4	7,400	6,720	0.91	38.8	D	5,940	0.79	44.1	C
	HOV	NB	1	1,850	1,870	1.01	--	--	2,450	1.32	--	--
		SB	1	1,850	2,140	1.16	--	--	1,940	0.99	--	--
Willow Street/Katella Avenue CD Road On Ramp to I-405	GP	NB	5	9,250	9,120	0.85	17.0	B	5,740	0.62	20.8	C
		SB	4	7,400	5,660	0.76	34.1	C	5,340	0.69	24.5	C
	HOV	NB	1	1,850	1,690	0.91	--	--	2,220	1.20	--	--
		SB	1	1,850	1,600	0.80	--	--	1,470	0.79	--	--
7th Street Interchange												
Pepper Tree Lane to Studebaker Road	GP	EB	2	3,700	3,270	0.88	17.5	D	3,550	0.85	16.9	B
		WB	3	5,550	5,650	0.96	19.7	C	2,470	0.22	10.4	B
	GP	EB	2	3,700	4,590	1.15	--	--	4,730	1.08	38.1	E
		WB	3	5,700	3,910	0.66	36.4	C	5,800	1.05	36.2	F

- Notes:
1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
 2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
 3. Level of Service (LOS): General Purpose (GP) lane LOS is based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS F.
 4. Peak hour capacities for freeway lanes include 1,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
 5. * Density is in excess of 45 pc/mi/ln, therefore LOS is F.

Long Beach Area Traffic Study

I-405 Improvement Project Supplemental Traffic Study

Table 4.3-6: No Build Alternative (Year 2020) Ramp Junction Peak Hour Level of Service

Interchange	Ramp Type	No Build Alternative (Year 2020) Conditions									
		AM Peak					PM Peak				
		Ramp Lanes	Ramp Capacity	Ramp Junction	Ramp Junction	Ramp Junction	Ramp Junction	Ramp Junction	Ramp Junction	Ramp Junction	Ramp Junction
				Traffic Volume ¹	Density ²	LOS ³	Traffic Volume ¹	Density ²	LOS ³	Traffic Volume ¹	LOS ³
I-405 Ramp Junctions											
Lakewood Blvd & Willow St	NB Off Direct	2	3,000	870	0.29	B	880	0.29	B	14.1	B
	NB On Loop	1	1,500	790	0.53	F	610	0.41	F	48.9	F
	NB On Direct	1	1,500	570	0.38	C	350	0.23	C	26.3	C
	SB Off Direct + Loop	2	3,000	1,160	0.39	B	1,420	0.47	F	20.4	F
Bellflower Blvd & Los Coyotes Diagonal	SB On Loop	1	1,500	310	0.21	F	370	0.25	F	43.1	F
	SB On Direct (from Willow St)	1	1,500	420	0.28	C	610	0.41	F	22.4	C
	NB Off Direct	1	1,500	540	0.36	C	560	0.37	F	50.5	D
	NB On Direct + Loop	2	3,000	1,260	0.42	F	840	0.28	F	12.6	F
Woodruff Ave	SB Off Direct + Loop	2	3,000	1,460	0.49	B	1,960	0.65	F	21.8	C
	SB On Direct + Loop	1	1,500	860	0.57	F	1,400	0.99	F	39.9	F
	NB Off Direct	1	1,500	580	0.39	C	280	0.19	C	24.3	C
	NB On Direct	1	1,500	470	0.31	F	320	0.21	F	39.6	F
Palo Verde Ave & Steam St	SB Off Direct	1	1,500	780	0.52	F	610	0.41	F	29.6	D
	NB On Direct	1	1,500	620	0.41	F	300	0.20	F	24.7	F
	NB Off Direct	1	1,500	690	0.46	F	790	0.53	F	27.8	F
	NB On Loop	1	1,500	200	0.13	F	330	0.22	F	56.8	F
Studebaker Rd	SB On Loop (from Steam St)	1	1,500	450	0.30	F	630	0.42	F	26.3	F
	NB On Direct	1	1,500	330	0.22	F	330	0.22	F	59.8	F
	SB Off Direct	1	1,500	430	0.29	F	330	0.22	F	35.8	E
	SB Off Direct	1	1,500	90	0.06	D	140	0.09	D	36.5	E

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GL-9 (Continued)

GL-9 (Continued)

Improvement Project Supplemental Traffic Study Long Beach Area Traffic Study

Table 4.3-6: No Build Alternative (Year 2020) Ramp Junction Peak Hour Level of Service									
Interchange	Ramp Type	Ramp Lanes	Ramp Capacity	No Build Alternative (Year 2020) Conditions				PM Peak	
				AM Peak		Ramp		Ramp Junction	
				Traffic Volume ¹	D/C	Density ²	LOS ^{3,5}	Traffic Volume ¹	D/C
1405 Ramp Junctions									
Canon St	NB Off Direct	1	1,500	960	0.64	32.0	D	940	0.63
	NB On Loop	1	1,500	460	0.31	20.4	C	510	0.34
	NB On Direct	1	1,500	760	0.52	20.7	C	790	0.49
	SB Off Direct	2	3,000	1,210	0.40	13.6	B	1,400	0.47
	SB On Loop	1	1,500	490	0.39	21.2	C	410	0.27
Spring St/Cerritos Ave	SB On Direct	1	1,500	250	0.17	21.7	C	330	0.22
	NB On Loop	1	1,500	760	0.52	35.5	B	1,090	0.73
	SB Off Direct	1	1,500	1,050	0.69	34.6	D	1,440	0.95
	NB Off (Direct + Loop)	1	1,500	1,210	0.81	0.2	A	870	0.58
	NB On Direct	1	1,500	1,120	0.75	19.8	B	1,460	0.97
Willow St/Karela Ave	SB Off Direct	1	1,500	590	0.39	34.2	D	560	0.37
	SB Off Loop	1	1,500	1,110	0.75	34.6	D	1,030	0.69
	SB On Direct (Direct + Loop)	1	1,500	650	0.43	23.5	C	890	0.59
	SB On Loop	1	1,500	650	0.43	23.5	C	890	0.59
	SB On Loop	1	1,500	650	0.43	23.5	C	890	0.59
7th Street Ramp Junctions									
Studebaker Rd	EB Off Loop	1	1,500	90	0.06	35.2	E	560	0.37
	EB On Loop	1	1,500	1,210	0.81	40.8	F	1,410	0.94
	WB Off Loop	1	1,500	740	0.49	40.5	F	1,400	0.93
	WB On Loop	1	1,500	520	0.35	28.1	D	370	0.25
	WB On Loop	1	1,500	520	0.35	28.1	D	370	0.25

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Orange County Transportation Authority

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.3-6: No Build Alternative (Year 2020) Ramp Junction Peak Hour Level of Service									
Interchange	Ramp Type	Ramp Lanes	Ramp Capacity	No Build Alternative (Year 2020) Conditions				PM Peak	
				AM Peak		Ramp		Ramp Junction	
				Traffic Volume ¹	D/C	Density ²	LOS ^{3,5}	Traffic Volume ¹	D/C
Freeway-to-Freeway Branch Connectors⁷									
I-405/I-605 Freeway Interchanges	I-605 SB to I-405 NB	1	1,800	970	0.51	--	--	1,120	0.62
	I-605 SB/7th St to I-405 NB	2	3,600	1,680	0.47	--	--	1,620	0.45
	I-405 SB to I-605 NB	2	3,600	1,400	0.39	--	--	1,260	0.35
	I-605 SB to 7th St/I-405 SB	2	3,600	4,750	1.32	--	--	4,020	1.12
	I-605 SB/I-405 SB to 7th St	1	1,800	2,640	1.13	--	--	1,360	0.76
7th St to I-605 NB/I-405 NB	7th St to I-605 NB/I-405 NB	2	3,600	1,210	0.34	--	--	1,330	0.37
	7th St to I-405 NB	1	1,800	770	0.43	--	--	440	0.24

Notes:

1. Peak hour capacity and traffic demand forecast volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS) is based on density (pc/mi/ln). D/C - demand-to-capacity ratio.
4. Peak hour capacities for freeway ramps include 1,500 vph for each freeway ramp lane and 1,800 vph for each freeway-to-freeway branch connector lane.
5. LOS F as the total flow of the merged/diverge area exceeds the capacity of the freeway segment; the density is not applicable in this case.
6. * Per Highway Capacity Manual, as the impact area of merge and diverge is primarily focused on an influence area of 1,500 ft, the density was not calculated for areas exceeding 1,500 ft in length.
7. For Freeway-to-Freeway branch connectors, D/C ratios are provided.

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GL-9 (Continued)

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.3-7: No Build Alternative (Year 2020) Weaving Level-of-Service Freeway and Collector-Distributor Roads				
Weaving Segment	AM Peak Hour		PM Peak Hour	
	Density ¹	LOS ²	Density ¹	LOS ²
Freeway Mainline				
I-405 Southbound - Lakewood Boulevard/Willow Street to Bellflower Boulevard	45.2	F	71.1	F
I-405 Northbound - Bellflower Boulevard to Lakewood Boulevard/Willow Street	46.7	F	39.4	E
I-405 Southbound - Bellflower Boulevard to Woodruff Avenue	40.3	E	66.9	F
I-405 Northbound - Woodruff Avenue to Bellflower Boulevard	51.5	F	45.2	F
I-405 Northbound - Palo Verde Avenue/Steams Street to Woodruff Avenue	45.3	F	38.3	E
I-405 Southbound - Palo Verde Avenue/Steams Street to Studebaker Road	32.6	D	44.2	F
I-405 Northbound - Studebaker Road to Palo Verde Avenue/Steams Street	43.6	F	43.1	F
Collector-Distributor (C-D) Roads				
Lakewood Boulevard/Willow Street Interchange at I-405				
Southbound C-D Road	16.5	B	23.7	C
Bellflower Boulevard/Los Coyotes Diagonal Interchange at I-405				
Southbound C-D Road	4.0	A	5.2	A

Notes:

1. Density is shown in passenger cars/mile/lane (pc/mi/ln).
2. Level of Service (LOS) is based on density (pc/mi/ln). The density LOS thresholds are different for the freeway mainline and collector-distributor roads.

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I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.3-8: No Build Alternative (Year 2040) Mainline Peak Hour Level of Service												
Location	Lane Type	Direction	Mainline		No Build Alternative (Year 2040) Conditions							
			Lanes	Capacity ¹	AM Peak Hour				PM Peak Hour			
					Traffic Demand Volume ²	D/C	Density ³	LOS ⁴	Traffic Demand Volume ²	D/C	Density ³	LOS ⁴
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Willow Street	GP	NB	5	5,200	10,400	1.11	—	F	10,410	1.15	—	F
		SB	5	5,200	10,500	1.14	49.5	F	10,510	1.18	—	F
	HOV	NB	1	1,850	2,210	1.09	—	—	2,370	1.28	—	—
		SB	1	1,850	1,970	1.06	—	—	2,120	1.15	—	—
Lakewood Boulevard/Willow Street to Bellflower Boulevard	GP	NB	5	5,200	Weaving Segment - Refer to Weave Table							
		SB	5	5,200	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	2,210	1.09	—	—	2,370	1.28	—	—
		SB	1	1,850	2,970	1.09	—	—	2,120	1.15	—	—
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	5,200	Weaving Segment - Refer to Weave Table							
		SB	5	5,200	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	1,870	1.01	—	—	2,140	1.22	—	—
		SB	1	1,850	2,060	1.11	—	—	2,140	1.21	—	—
Woodruff Avenue to Palo Verde Avenue/Steams Street	GP	NB	5	5,200	Weaving Segment - Refer to Weave Table							
		SB	4	7,400	9,120	1.25	—	F	9,300	1.28	—	F
	HOV	NB	1	1,850	1,870	1.01	—	—	2,150	1.22	—	—
		SB	1	1,850	2,430	1.21	—	—	2,150	1.16	—	—
Palo Verde Avenue/Steams Street to Studebaker Road	GP	NB	5	5,200	Weaving Segment - Refer to Weave Table							
		SB	5	5,200	Weaving Segment - Refer to Weave Table							
	HOV	NB	1	1,850	1,870	1.01	—	—	2,250	1.22	—	—
		SB	1	1,850	2,310	1.25	—	—	2,380	1.21	—	—
Studebaker Road to I-405 NB Off Ramp	GP	NB	4	7,400	9,290	1.26	—	F	10,180	1.30	—	F
		SB	5	5,200	9,240	1.00	39.7	D	9,430	1.06	44.1	E
	HOV	NB	1	1,850	2,720	1.46	—	—	3,300	1.88	—	—
		SB	1	1,850	2,310	1.75	—	—	2,790	1.21	—	—
I-405 NB Off Ramp to 7th St Off Ramp	GP	NB	1	7,400	7,470	1.01	40.1	E	8,590	1.26	—	—
		SB	4	7,400	7,740	1.24	26.7	C	8,460	1.24	—	—
	HOV	NB	1	1,850	2,730	1.46	—	—	3,720	1.88	—	—
		SB	4	7,400	7,770	1.01	40.1	E	8,590	1.16	—	—
7th St Off Ramp to I-405 SB On Ramp	GP	NB	1	7,400	7,480	1.03	33.8	E	8,510	1.12	—	—
		SB	1	1,850	2,730	1.46	—	—	3,020	1.62	—	—
	HOV	NB	1	1,850	2,730	1.26	—	—	2,230	1.21	—	—
		SB	1	1,850	2,730	1.26	—	—	2,230	1.21	—	—
I-405 Mainline												
Carson Street to Spring Street	GP	NB	4	7,400	6,480	0.88	28.8	D	8,020	1.08	44.4	E
		SB	4	7,400	8,170	1.11	—	F	7,970	1.08	40.6	E
	HOV	NB	1	1,850	1,830	0.98	—	—	2,050	1.11	—	—
		SB	1	1,850	2,100	1.14	—	—	1,880	1.02	—	—
Spring Street to Willow Street/Catella Avenue	GP	NB	4	7,400	5,540	0.75	22.7	C	6,940	0.81	26.5	D
		SB	4	7,400	7,150	0.98	31.6	D	6,510	0.85	26.5	D
	HOV	NB	1	1,850	1,830	0.98	—	—	2,050	1.11	—	—
		SB	1	1,850	2,100	1.14	—	—	1,880	1.02	—	—
Willow Street/Catella Avenue CD Road On Ramp to I-405	GP	NB	5	5,200	5,540	0.62	19.3	C	5,500	0.67	22.5	D
		SB	4	7,400	6,120	0.83	26.6	D	5,560	0.75	26.5	D
	HOV	NB	1	1,850	2,020	1.09	—	—	2,050	1.09	—	—
		SB	1	1,850	2,810	1.25	—	—	1,990	1.23	—	—
7th Street Mainline												
Pepper Tree Lane to Studebaker Road	GP	EB	2	8,700	3,940	0.93	18.9	C	3,420	0.91	18.3	C
		WB	8	5,350	5,950	0.72	21.4	C	3,100	0.56	15.6	B
	HOV	EB	2	1,850	2,730	1.26	—	—	2,230	1.21	—	—
		WB	2	1,850	2,730	1.26	—	—	2,230	1.21	—	—

Notes:

1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS): General Purpose (GP) lane LOS is based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS F.
4. Peak hour capacities for freeway lanes include 1,800 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
5. * Density is in excess of 45 pc/mi/ln, therefore LOS is F.

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GL-9 (Continued)

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study Long Beach Area Traffic Study

Table 4.3-9: No Build Alternative (Year 2040) Ramp Junction Peak Hour Level of Service										
Interchange	Ramp Type	Ramp Lanes Capacity	No Build Alternative (Year 2040) Conditions				PM Peak			
			AM Peak		PM Peak		Ramp Junction		Ramp Junction	
			Traffic Volume ¹	D/C	Density ²	LOS ³	Traffic Volume ¹	D/C	Density ²	LOS ³
I-405 Ramp Junctions										
Lakewood Blvd & Willow St	NB Off Direct	2	3,000	0.31	14.6	B	950	0.32	16.2	F
	NB On Loop	1	1,500	0.57	48.0	F	650	0.44	52.6	F
	NB On Direct	1	1,500	0.41	26.6	F	370	0.25	28.4	F
	SB Off (Direct + Loop)	2	3,000	0.42	20.2	C	1,520	0.51	22.8	F
Bellflower Blvd & Los Coyotes Diagonal	SB On Loop	1	1,500	0.22	45.9	F	400	0.27	46.4	F
	SB On Direct (From Willow St)	1	1,500	0.31	23.6	C	650	0.44	23.8	F
	NB Off Direct	1	1,500	0.39	29.1	D	610	0.41	33.4	F
	NB On (Direct + Loop)	2	3,000	0.45	16.0	F	910	0.30	14.5	F
Woodruff Ave	SB Off (Direct + Loop)	2	3,000	0.53	19.8	B	2,120	0.71	24.5	F
	SB On (Direct + Loop)	1	1,500	0.62	37.2	F	1,520	1.01	35.5	F
	NB Off Direct	1	1,500	0.42	25.2	C	300	0.20	27.0	C
	NB On Direct	1	1,500	0.34	36.5	F	340	0.23	42.5	F
Palo Verde Ave & Stearn St	SB Off Direct	1	1,500	0.55	31.8	D	670	0.45	32.4	D
	SB On Direct	1	1,500	0.45	23.9	F	320	0.21	26.1	F
	NB Off Direct	1	1,500	0.50	26.8	C	860	0.57	30.9	F
	NB On Loop	1	1,500	0.14	55.7	F	350	0.23	61.5	F
Studebaker Rd	SB On Direct (From Stearn St)	1	1,500	0.33	27.6	F	680	0.45	27.5	F
	NB On Direct	1	1,500	0.23	58.0	F	350	0.23	64.8	F
	SB Off Direct	1	1,500	0.31	37.6	E	350	0.23	38.5	F
	SB Off Direct	1	1,500	0.07	35.9	E	150	0.10	39.2	F

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I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.3-9: No Build Alternative (Year 2040) Ramp Junction Peak Hour Level of Service											
Interchange	Ramp Type	Ramp Lanes Capacity	No Build Alternative (Year 2040) Conditions								
			AM Peak			PM Peak					
			Ramp	Ramp Junction	Ramp	Ramp Junction	Ramp Junction				
			Traffic Volume ¹	D/C	Density ²	LOS ³	Traffic Volume ¹	D/C	Density ²	LOS ³	
I-605 Ramp Junctions											
Carson St	NB Off Direct	1	1,500	1,040	0.69	34.5	D	1,020	0.68	41.4	F
	NB On Loop	1	1,500	500	0.33	21.7	C	560	0.37	26.5	C
	NB On Direct	1	1,500	840	0.56	21.7	C	790	0.53	25.2	F
	SB Off Direct	2	3,000	1,310	0.44	15.7	B	1,520	0.51	16.6	B
	SB On Loop	1	1,500	530	0.35	23.3	C	440	0.29	22.3	C
	SB On Direct	1	1,500	270	0.18	24.0	F	350	0.23	22.5	C
	NB On Loop	1	1,500	850	0.57	19.2	B	1,180	0.79	21.0	C
	SB Off Direct	1	1,500	1,110	0.74	37.2	E	1,560	1.04	38.0	E
Spring St/Cerritos Ave	NB Off Direct + Loop	1	1,500	1,210	0.81	2.2	A	940	0.63	1.8	A
	NB On Direct	1	1,500	1,210	0.81	20.8	C	1,580	1.05	23.3	C
	SB Off Direct	1	1,500	640	0.43	36.8	E	610	0.41	32.6	D
	SB Off Loop	1	1,500	1,210	0.81	37.2	E	1,110	0.74	32.7	D
Willow St/Karelin Ave	SB On Direct + Loop	1	1,500	710	0.47	25.2	C	960	0.64	22.9	C
	7th Street Ramp Junctions										
	EB Off Loop	1	1,500	100	0.07	37.8	E	610	0.41	36.6	E
	EB On Loop	1	1,500	1,310	0.87	43.8	F	1,530	1.02	40.2	F
Studebaker Rd	WB Off Loop	1	1,500	800	0.53	43.6	F	1,520	1.01	43.5	F
	WB On Loop	1	1,500	380	0.27	23.0	C	400	0.27	23.0	C

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GL-9 (Continued)

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study Long Beach Area Traffic Study

Table 4.3-9: No Build Alternative (Year 2040) Ramp Junction Peak Hour Level of Service

Interchange	Ramp Type	Ramp Lanes	Ramp Capacity ^{1,4}	No Build Alternative (Year 2040) Conditions							
				AM Peak				PM Peak			
				Ramp		Ramp Junction		Ramp		Ramp Junction	
				Traffic Volume ¹	D/C	Density ²	LOS ^{3,5}	Traffic Volume ¹	D/C	Density ²	LOS ^{3,5}
Freeway - to - Freeway Branch Connectors ⁷											
I-405/I-505 Freeway Interchanges	I-605 SB to I-405 NB	1	1,800	990	0.55	--	--	1,210	0.67	--	--
	I-605 SB/7th St to I-405 NB	2	3,600	1,820	0.51	--	--	1,750	0.49	--	--
	I-405 SB to I-605 NB	2	3,600	1,520	0.43	--	--	1,350	0.38	--	--
	I-605 SB to 7th St/I-405 SB	2	3,600	5,130	1.43	--	--	4,340	1.21	--	--
	I-605 SB/I-405 SB to 7th St	1	1,800	2,200	1.22	--	--	1,470	0.82	--	--
	7th St to I-605 NB/I-405 NB	2	3,600	1,310	0.36	--	--	1,430	0.40	--	--
	7th St to I-405 NB	1	1,800	830	0.46	--	--	480	0.27	--	--

Notes:

1. Peak hour capacity and traffic demand forecast volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS) is based on density (pc/mi/ln). D/C - demand-to-capacity ratio.
4. Peak hour capacities for freeway ramps include 1,500 vph for each freeway ramp lane and 1,800 vph for each freeway-to-freeway branch connector lane.
5. Peak hour capacities for freeway interchanges include 1,500 vph for each freeway ramp lane and 1,800 vph for each freeway-to-freeway branch connector lane.
6. LOS F is the total flow of the merge/diverge area exceeds the capacity of the freeway segment; the density is not applicable in this case.
7. * Per Highway Capacity Manual, as the impact area of merge and diverge is primarily focused on an influence area of 1,500 ft, the density was not calculated for areas exceeding 1,500 ft in length.
8. For freeway-to-freeway branch connectors, D/C ratios are provided.

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Long Beach Area Traffic Study

Table 4.3-10: No Build Alternative (Year 2040) Weaving Level-of-Service
Freeway and Collector-Distributor Roads

Weaving Segment	AM Peak Hour		PM Peak Hour	
	Density ¹	LOS ²	Density ¹	LOS ²
Freeway Mainline				
I-405 Southbound - Lakewood Boulevard/Willow Street to Bellflower Boulevard	50.1	F	78.5	F
I-405 Northbound - Bellflower Boulevard to Lakewood Boulevard/Willow Street	51.2	F	43.3	F
I-405 Southbound - Bellflower Boulevard to Woodruff Avenue	44.6	F	73.8	F
I-405 Northbound - Woodruff Avenue to Bellflower Boulevard	57.0	F	50.2	F
I-405 Northbound - Palo Verde Avenue/Stearns Street to Woodruff Avenue	49.7	F	42.1	E
I-405 Southbound - Palo Verde Avenue/Stearns Street to Studebaker Road	35.7	E	48.3	F
I-405 Northbound - Studebaker Road to Palo Verde Avenue/Stearns Street	48.0	F	47.7	F
Collector-Distributor (C-D) Roads				
Lakewood Boulevard/Willow Street Interchange at I-405				
Southbound C-D Road	16.5	B	23.7	C
Bellflower Boulevard/Los Coyotes Diagonal Interchange at I-405				
Southbound C-D Road	4.0	A	5.2	A

Notes:

1. Density is shown in passenger cars/mile/lane (pc/mi/ln).
2. Level of Service (LOS) is based on density (pc/mi/ln). The density LOS thresholds are different for the freeway mainline and collector-distributor roads.

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

No.	Location			Alternative 1 (Year 2020) LOS					
	East/West Street	North/South Street	Traffic Control/Comments	AM Peak Hour			PM Peak Hour		
				D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS
1	Carson St	I-405 SB Off Ramp	Existing Traffic Signal	0.56	18.7	B	0.67	20.1	C
2	Carson St	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.24	--	--	0.38	--	--
		I-405 SB Loop On Ramp	Unsignalized On Ramp	0.35	--	--	0.36	--	--
		I-405 NB Off Ramp	Existing Traffic Signal	0.59	20.3	C	0.76	16.6	B
3	Carson St	I-405 NB Loop On Ramp	Unsignalized On Ramp	0.30	--	--	0.35	--	--
		I-405 NB Direct On Ramp	Unsignalized On Ramp	0.51	--	--	0.46	--	--
		Pioneer Blvd	Existing Traffic Signal	0.79	30.7	C	0.87	31.6	C
4	Spring St/Cerritos Ave	I-405 SB Off Ramp	Existing Traffic Signal	0.68	14.0	B	0.61	10.3	B
5	Spring St/Cerritos Ave	I-405 NB On Ramp	Existing Traffic Signal	0.73	9.3	A	0.78	8.1	A
6	I-405 NB Direct Off Ramp	I-405 NB Direct Off Ramp	Unsignalized Off Ramp	0.43	--	--	0.41	--	--
		I-405 NB Loop On Ramp	Unsignalized On Ramp	0.38	--	--	0.22	--	--
		I-405 NB Loop Off Ramp	Unsignalized On Ramp	0.26	--	--	0.22	--	--
7	I-405 NB Loop On Ramp	Lakewood Blvd	Unsignalized On Ramp	0.53	--	--	0.41	--	--
		I-405 SB Loop On Ramp	Unsignalized On Ramp	0.23	--	--	0.25	--	--
		I-405 SB Direct Off Ramp	Unsignalized Off Ramp	0.41	--	--	0.46	--	--
8	Willow St	Lakewood Blvd	Existing Traffic Signal	0.74	28.9	C	0.96	46.5	D
9	Willow St	I-405 SB Loop Off Ramp	Unsignalized Off Ramp	0.33	--	--	0.45	--	--
		I-405 SB Direct On Ramp	Unsignalized On Ramp	0.29	--	--	0.41	--	--
		I-405 NB Off Ramp	Existing Traffic Signal	0.51	10.4	B	0.58	10.9	B
10	I-405 NB Loop On Ramp	Belflower Blvd	Unsignalized On Ramp	0.51	--	--	0.37	--	--
		I-405 NB Direct On Ramp	Unsignalized On Ramp	0.29	--	--	0.19	--	--
		Belflower Blvd	Existing Traffic Signal	1.00	50.1	D	1.00	51.2	D
11	Willow St	Belflower Blvd	Existing Traffic Signal	0.64	27.5	C	1.06	44.6	D
12	Los Coyotes Diagonal	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.08	--	--	0.12	--	--
		Belflower Blvd	Unsignalized On Ramp	0.12	--	--	0.20	--	--
		I-405 SB Direct Off Ramp	Existing Traffic Signal	0.52	10.3	B	0.47	14.0	B
13	Los Coyotes Diagonal	I-405 SB Loop On Ramp	Unsignalized On Ramp	0.25	--	--	0.17	--	--
14	Willow St	Los Coyotes Diagonal	Existing Traffic Signal	0.77	31.7	C	1.04	36.7	D
15	Willow St	Woodruff Ave	Existing Traffic Signal	1.32	146.2	F	0.88	40.9	D
16	I-405 NB Direct Off Ramp	Woodruff Ave	Unsignalized Off Ramp	0.39	--	--	0.20	--	--
		I-405 NB Direct On Ramp	Unsignalized On Ramp	0.31	--	--	0.21	--	--
		I-405 SB Direct Off Ramp	Unsignalized Off Ramp	0.51	--	--	0.45	--	--
17	I-405 SB Direct On Ramp	Woodruff Ave	Unsignalized On Ramp	0.43	--	--	0.23	--	--
		I-405 NB Direct Off Ramp	Existing Traffic Signal	0.78	17.0	B	0.63	12.0	B
		I-405 NB Loop On Ramp	Unsignalized On Ramp	0.15	--	--	0.20	--	--
18	Woodruff Ave	Palo Verde	Existing Traffic Signal	0.84	12.9	B	0.68	10.2	B
19	Stearns St	Palo Verde	Existing Traffic Signal	0.86	18.5	B	0.85	21.0	C
20	Stearns St	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.33	--	--	0.44	--	--
21	I-405 NB Direct On Ramp	Studebaker Rd	Existing Traffic Signal	0.51	1.2	A	0.50	3.1	A
22	I-405 SB Direct Off Ramp	Studebaker Rd	Unsignalized Intersection	1.03	113.3	F	0.51	24.8	C
23	Atherton St	Studebaker Rd	Existing Traffic Signal	0.54	10.3	B	0.79	14.8	B
24	SR-22 WB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.83	19.0	B	0.76	27.3	C
25	SR-22 EB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.97	28.9	C	0.96	28.6	C
26	SR-22 WB On/Off Ramp	College Park Dr	Unsignalized Intersection	0.51	24.3	C	0.73	104.8	F
27	7th St	Pacific Coast Highway	Existing Traffic Signal	0.96	53.2	D	0.96	37.4	D
28	7th St	Belflower Blvd	Existing Traffic Signal	1.06	72.4	E	0.96	42.8	D
29	Pacific Coast Highway	Belflower Blvd	Existing Traffic Signal	0.50	36.6	D	0.69	19.5	B
30	7th St	Channel Dr	Existing Traffic Signal	0.74	23.2	C	0.95	25.6	C
31	7th St	W. Campus Dr	Existing Traffic Signal	0.79	33.2	C	0.82	35.6	D
32	7th St	E. Campus Dr	Existing Traffic Signal	1.03	38.0	D	0.88	24.9	B

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

No.	Location		Movement	Available Storage (ft)	2020 Alternative 1 Conditions			
	East/West Street	North/South Street			AM Peak Hour		PM Peak Hour	
					95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
1	Carson St	I-605 SB Off Ramp	SBL	800	211	Yes	337	No
			SRT	1,130	121	Yes	178	Yes
			SBR	800	238	Yes	186	Yes
3	Carson St	I-605 NB Off Ramp	NBL	300 (650)	234	Yes	294	Yes
			NRR	300(1175)	210	Yes	133	Yes
			NBL	120	232	No	285	No
4	Carson St	Pioneer Blvd	SBL	140	77	Yes	76	Yes
			SBR	140	72	Yes	84	Yes
			EBL	250	273	No	413	No
			WBL	80	17	Yes	16	Yes
			SBL	220 (1240)	264	Yes	160	Yes
5	Spring St/Cerritos Ave	I-605 SB Off Ramp	SBR	900	0	Yes	0	Yes
6	Spring St/Cerritos Ave	I-605 NB On Ramp	WBL	260	221	Yes	165	Yes
9	Willow St	Lakewood Blvd	NBL	180	130	Yes	130	Yes
			SBL	150	44	Yes	97	Yes
			EBL	175	68	Yes	78	Yes
			WBL	150	39	Yes	128	Yes
			WBL	1,870	103	Yes	175	Yes
11	I-405 NB Off Ramp	Bellflower Blvd	WBL/T/R	1,130	54	Yes	173	Yes
			W/R	410	51	Yes	156	Yes
			NBL	150	357	No	135	Yes
12	Willow St	Bellflower Blvd	SBL	120	135	No	113	Yes
			EBL	140	212	No	342	No
			WBL	110	215	No	239	No
			NBL	160	23	Yes	36	Yes
			NBR	230	49	Yes	163	Yes
13	Los Coyotes Diagonal	Bellflower Blvd	EBL	190	319	No	587	No
			WBL	190	206	No	263	No
			SBL	1525 (500)	140	Yes	257	Yes
15	Los Coyotes Diagonal	I-405 SB Direct Off Ramp	SBL	120	142	No	239	No
16	Willow St	Los Coyotes Diagonal	EBL	140	158	No	72	Yes
			WBL	160	326	No	595	No
			NBL	140	688	No	268	No
			NBR	60	34	Yes	18	Yes
			SBL	120	129	No	63	Yes
17	Willow St	Woodruff Ave	SBR	120	138	No	50	Yes
			EBL	200	246	No	173	Yes
			WBL	180	280	No	194	No
			WBL	550	393	Yes	259	Yes
			WBL/T/R	1,135	72	Yes	163	Yes
21	Woodruff Ave	Palo Verde	EBL	335	319	Yes	209	Yes
			EBR	335	194	Yes	180	Yes
			NBL	130	155	No	167	No
22	Stearns St	Palo Verde	SBL	120	95	Yes	173	No
			EBL	90	219	No	178	No
			WBL	80	36	Yes	117	No
24	I-405 NB Direct On Ramp	Studebaker Rd	NBL	100	1	Yes	58	Yes
			SBR	70	8	Yes	18	Yes

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.4-2 Alternative 1 (Year 2020) Intersection Queues vs Storage - AM/PM Peak Hours								
No.	Location		Movement	Available Storage (ft)	2020 Alternative 1 Conditions			
	East/West Street	North/South Street			AM Peak Hour		PM Peak Hour	
					95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
26	Athenion St	Studebaker Rd	NBL	200	40	Yes	56	Yes
			SRL	260	1	Yes	3	Yes
			SBR	70	61	Yes	21	Yes
			EBL	120	77	Yes	223	No
			WBL	220	28	Yes	26	Yes
27	SR-22 WB On/Off Ramp	Studebaker Rd	NBR	150	15	Yes	21	Yes
			SBL	200	64	Yes	176	Yes
28	SR-22 EB On/Off Ramp	Studebaker Rd	NBR	300	1180	No	1032	No
			SBL	150	386	No	257	No
			WBR	60	50	Yes	145	No
30	7th St	Pacific Coast Highway	NBL	330	163	Yes	243	Yes
			SBL	290	275	Yes	364	No
31	7th St	Bellflower Blvd	NBR	130	95	Yes	35	Yes
			SBL	160	166	No	228	No
			SBR	160	82	Yes	250	No
			EBL	200	450	No	365	No
			WBL	200	39	Yes	74	Yes
32	Pacific Coast Highway	Bellflower Blvd	NBL	280	96	Yes	73	Yes
			SBL	240	231	Yes	204	Yes
			SBR	60	21	Yes	33	Yes
			EBL	110	59	Yes	105	Yes
			WBL	170	49	Yes	59	Yes
33	7th St	Channel Dr	WBR	200	58	Yes	39	Yes
			EBL	270	107	Yes	29	Yes
			EBR	180	22	Yes	6	Yes
34	7th St	W. Campus Dr	WBL	280	106	Yes	262	Yes
			SBL/R	150	68	Yes	216	No
			EBL	400	91	Yes	28	Yes
35	7th St	E. Campus Dr	SBL	150	76	Yes	186	No
			SBL/R	150	67	Yes	109	Yes
			EBL	150	207	No	102	Yes
			WBL	300	76	Yes	135	Yes

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.4-3 Alternative 1 (Year 2040) Intersection Level of Service - AM/PM Peak Hours										
No.	Location			Traffic Control/Comments	Alternative 1 (Year 2040) LOS					
	East/West Street	North/South Street	D/C		AM Peak Hour		PM Peak Hour		LOS	
					Avg Delay (sec)	LOS	D/C	Avg Delay (sec)		LOS
1	Carson St	I-605 SB Off Ramp	Existing Traffic Signal	0.63	18.8	B	0.78	20.8	C	
2	Carson St	I-605 SB Direct On Ramp	Unsignalized On Ramp	0.26	--	--	0.41	--	--	
		I-605 SB Loop On Ramp	Unsignalized On Ramp	0.38	--	--	0.39	--	--	
		I-605 NB Off Ramp	Existing Traffic Signal	0.63	21.8	C	0.82	18.4	B	
3	Carson St	I-605 NB Loop On Ramp	Unsignalized On Ramp	0.33	--	--	0.37	--	--	
		I-605 NB Direct On Ramp	Unsignalized On Ramp	0.55	--	--	0.49	--	--	
		Pioneer Blvd	Existing Traffic Signal	0.87	34.7	C	0.90	41.4	D	
4	Carson St	I-605 SB Off Ramp	Existing Traffic Signal	0.73	15.2	B	0.70	11.4	B	
5	Spring St/Correros Ave	I-605 NB On Ramp	Existing Traffic Signal	0.79	10.3	B	0.85	9.5	A	
6	Spring St/Correros Ave	I-405 NB Direct Off Ramp	Unsignalized Off Ramp	0.47	--	--	0.44	--	--	
		I-405 NB Direct On Ramp	Unsignalized On Ramp	0.41	--	--	0.24	--	--	
		I-405 NB Loop Off Ramp	Unsignalized Off Ramp	0.28	--	--	0.24	--	--	
7	Lakewood Blvd	I-405 NB Loop On Ramp	Unsignalized On Ramp	0.57	--	--	0.44	--	--	
		I-405 SB Loop On Ramp	Unsignalized On Ramp	0.25	--	--	0.27	--	--	
		I-405 SB Direct Off Ramp	Unsignalized Off Ramp	0.44	--	--	0.50	--	--	
8	Willow St	Lakewood Blvd	Existing Traffic Signal	0.79	33.1	C	0.93	48.7	D	
9	Willow St	I-405 SB Loop Off Ramp	Unsignalized Off Ramp	0.36	--	--	0.48	--	--	
		I-405 SB Direct On Ramp	Unsignalized On Ramp	0.31	--	--	0.44	--	--	
		I-405 NB Off Ramp	Existing Traffic Signal	0.55	11.3	B	0.58	11.3	B	
10	Willow St	I-405 NB Loop On Ramp	Unsignalized On Ramp	0.55	--	--	0.40	--	--	
		I-405 NB Direct On Ramp	Unsignalized On Ramp	0.32	--	--	0.20	--	--	
		Bellflower Blvd	Existing Traffic Signal	1.09	68.2	E	1.10	68.1	E	
11	Willow St	Bellflower Blvd	Existing Traffic Signal	0.70	28.1	C	1.15	59.4	E	
		Bellflower Blvd	Unsignalized On Ramp	0.08	--	--	0.13	--	--	
		I-405 SB Loop Off Ramp	Unsignalized On Ramp	0.13	--	--	0.32	--	--	
12	Los Coyotes Diagonal	I-405 SB Direct Off Ramp	Existing Traffic Signal	0.56	10.8	B	0.51	14.7	B	
		I-405 SB Loop On Ramp	Unsignalized On Ramp	0.27	--	--	0.18	--	--	
		Los Coyotes Diagonal	Existing Traffic Signal	0.86	36.4	D	1.20	50.4	D	
13	Willow St	Woodruff Ave	Existing Traffic Signal	1.43	179.2	F	0.94	53.1	D	
14	Willow St	I-405 NB Direct Off Ramp	Unsignalized Off Ramp	0.43	--	--	0.22	--	--	
		I-405 NB Direct On Ramp	Unsignalized On Ramp	0.34	--	--	0.23	--	--	
		I-405 SB Direct Off Ramp	Unsignalized Off Ramp	0.55	--	--	0.49	--	--	
15	Woodruff Ave	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.47	--	--	0.25	--	--	
		I-405 NB Direct Off Ramp	Existing Traffic Signal	0.96	20.6	C	0.73	13.1	B	
		I-405 NB Loop On Ramp	Unsignalized On Ramp	0.17	--	--	0.21	--	--	
16	Woodruff Ave	Palo Verde	Existing Traffic Signal	0.92	15.4	B	0.74	11.2	B	
17	Stearns St	Palo Verde	Existing Traffic Signal	0.94	21.7	C	0.93	25.1	C	
18	Stearns St	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.35	--	--	0.48	--	--	
19	I-405 NB Direct On Ramp	Studebaker Rd	Existing Traffic Signal	0.55	1.4	A	0.54	3.2	A	
20	I-405 SB Direct Off Ramp	Studebaker Rd	Unsignalized Intersection	1.24	170.6	F	0.53	25.2	D	
21	Athenion St	Studebaker Rd	Existing Traffic Signal	0.58	11.1	B	0.86	16.8	B	
22	SR-22 WB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.52	13.5	B	0.82	29.1	C	
23	SR-22 EB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	1.05	43.5	D	1.06	40.4	D	
24	SR-22 WB On/Off Ramp	College Park Dr	Unsignalized Intersection	0.61	30.2	D	1.00	184.2	F	
25	7th St	Pacific Coast Highway	Existing Traffic Signal	1.04	71.5	E	1.04	62.4	E	
26	7th St	Bellflower Blvd	Existing Traffic Signal	1.14	84.9	F	1.04	57.2	E	
27	Pacific Coast Highway	Bellflower Blvd	Existing Traffic Signal	0.54	36.9	D	0.81	32.0	C	
28	7th St	Channel Dr	Existing Traffic Signal	0.80	24.3	C	1.03	55.3	E	
29	7th St	W. Campus Dr	Existing Traffic Signal	0.86	55.3	E	0.89	64.3	E	
30	7th St	E. Campus Dr	Existing Traffic Signal	1.13	58.6	E	0.97	17.2	B	

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Long Beach Area Traffic Study

No.	Location		Movement	Available Storage (ft)	2040 Alternative 1 Conditions			
					AM Peak Hour		PM Peak Hour	
	East/West Street	North/South Street			95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
1	Carson St	I-605 SB Off Ramp	SBL	300	231	Yes	974	No
			SAT	1,130	133	Yes	195	Yes
			SBR	300	267	Yes	205	Yes
3	Carson St	I-605 NB Off Ramp	NBL	300 (650)	255	Yes	322	Yes
			NBR	300 (1,75)	234	Yes	143	Yes
			NBL	120	256	No	313	No
4	Carson St	Pioneer Blvd	SBL	140	82	Yes	81	Yes
			SBR	140	74	Yes	88	Yes
			EBL	250	307	No	452	No
			WBL	80	18	Yes	16	Yes
			SBL	220 (1240)	279	Yes	167	Yes
5	Spring St/Cerritos Ave	I-605 SB Off Ramp	SBR	900	0	Yes	0	Yes
			WBL	260	239	Yes	181	Yes
6	Spring St/Cerritos Ave	I-605 NB On Ramp	NBL	180	140	Yes	157	Yes
			SBL	150	52	Yes	103	Yes
9	Willow St	Lakewood Blvd	EBL	175	80	Yes	100	Yes
			WBL	150	45	Yes	152	No
			WBL	1,870	110	Yes	187	Yes
11	I-405 NB Off Ramp	Bellflower Blvd	WBL/T/R	1,130	65	Yes	196	Yes
			WBR	410	61	Yes	176	Yes
			NBL	150	394	No	135	Yes
12	Willow St	Bellflower Blvd	SBL	120	147	No	115	Yes
			EBL	140	230	No	377	No
			WBL	110	216	No	247	No
13	Los Coyotes Diagonal	Bellflower Blvd	NBL	160	25	Yes	39	Yes
			NBR	230	51	Yes	203	Yes
			EBL	190	344	No	647	No
15	Los Coyotes Diagonal	I-405 SB Direct Off Ramp	WBL	150	217	No	286	No
			SBL	1525 (500)	153	Yes	274	Yes
			SBL	120	173	No	279	No
16	Willow St	Los Coyotes Diagonal	EBL	140	167	No	71	Yes
			WBL	160	356	No	660	No
			NBL	140	753	No	318	No
17	Willow St	Woodruff Ave	NBR	60	35	Yes	19	Yes
			SBL	120	137	No	66	Yes
			SBR	120	156	No	58	Yes
			EBL	200	268	No	193	Yes
			WBL	180	289	No	213	No
20	I-405 NB Direct Off Ramp	Palo Verde	WBL	550	426	Yes	290	Yes
			WBL/T/R	1,155	90	Yes	225	Yes
21	Woodruff Ave	Palo Verde	EBL	335	355	No	291	Yes
			EBR	335	238	Yes	204	Yes
22	Stearns St	Palo Verde	NBL	130	169	No	181	No
			SBL	120	94	Yes	162	No
			EBL	90	245	No	199	No
24	I-405 NB Direct On Ramp	Studebaker Rd	WBL	80	39	Yes	132	No
			NBL	100	1	Yes	57	Yes
			SBR	70	9	Yes	20	Yes

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

No.	Location		Movement	Available Storage (ft)	2040 Alternative 1 Conditions			
					AM Peak Hour		PM Peak Hour	
	East/West Street	North/South Street			95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
26	Atherton St	Studebaker Rd	NBL	200	67	Yes	75	Yes
			SBL	260	2	Yes	3	Yes
			SBR	70	85	No	21	Yes
			EBL	120	81	Yes	248	No
			WBL	220	30	Yes	28	Yes
27	SR-22 WB On/Off Ramp	Studebaker Rd	NBR	150	15	Yes	22	Yes
			SBL	200	77	Yes	199	Yes
28	SR-22 EB On/Off Ramp	Studebaker Rd	NBR	300	1362	No	1198	No
			SBL	150	421	No	270	No
			WBR	60	51	Yes	174	No
30	7th St	Pacific Coast Highway	NBL	330	174	Yes	269	Yes
			SBL	290	303	No	411	No
31	7th St	Bellflower Blvd	NBR	130	127	Yes	29	Yes
			SBL	160	188	No	254	No
			SBR	160	87	Yes	310	No
			EBL	200	473	No	345	No
			WBL	200	37	Yes	70	Yes
32	Pacific Coast Highway	Bellflower Blvd	NBL	280	102	Yes	76	Yes
			SBL	240	247	No	195	Yes
			SBR	60	19	Yes	37	Yes
			EBL	110	62	Yes	127	No
			WBL	120	52	Yes	66	Yes
33	7th St	Channel Dr	WBR	200	60	Yes	40	Yes
			EBL	270	107	Yes	24	Yes
			SBR	180	21	Yes	61	Yes
34	7th St	W. Campus Dr	WBL	280	107	Yes	264	Yes
			SBL/T/R	150	73	Yes	235	No
35	7th St	E. Campus Dr	EBL	400	85	Yes	28	Yes
			SBL	150	82	Yes	207	No
			SAT/T/R	150	71	Yes	128	Yes
			EBL	150	212	No	104	Yes
			WBL	300	80	Yes	147	Yes

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GL-9 (Continued)

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.4-5: Alternative 1 (Year 2020) Mainline Peak Hour Level of Service													
Location	Lane Type	Direction	Mainline		Alternative 1 (Year 2020) Conditions								
			Lanes	Capacity ^{1,4}	Traffic Demand Volume ²	AM Peak Hour				PM Peak Hour			
						D/C	Density ³	LOS ⁵	Traffic Demand Volume ²	D/C	Density ³	LOS ⁵	
I-405 Mainline													
Temple Avenue to Lakewood Boulevard/Wilcox Street	GP	NB	5	9,250	8,540	1.08	43.6	E	10,490	1.12	— ^a	F	
		SB	5	9,250	8,680	1.05	36.0	E	10,060	1.09	— ^a	F	
	HOV	NB	1	1,850	2,070	1.12	—	—	1,980	1.07	—	—	
		SB	1	1,850	1,990	1.08	—	—	2,140	1.16	—	—	
Lakewood Boulevard/Wilcox Street to Bellflower Boulevard	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table								
		SB	5	9,250	Weaving Segment - Refer to Weave Table								
	HOV	NB	1	1,850	2,050	1.11	—	—	2,090	1.12	—	—	
		SB	1	1,850	1,990	1.06	—	—	2,140	1.16	—	—	
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table								
		SB	5	9,250	Weaving Segment - Refer to Weave Table								
	HOV	NB	1	1,850	2,050	1.11	—	—	2,090	1.11	—	—	
		SB	1	1,850	1,990	1.08	—	—	2,140	1.16	—	—	
Woodruff Avenue to Palo Verde Avenue/Stearns Street	GP	NB	5	9,250	Weaving Segment - Refer to Weave Table								
		SB	5	9,250	Weaving Segment - Refer to Weave Table								
	HOV	NB	1	1,850	2,070	1.12	— ^a	F	8,820	1.19	— ^a	F	
		SB	1	1,850	2,070	1.17	—	—	2,060	1.11	—	—	
Palo Verde Avenue/Stearns Street to Studebaker Road	GP	NB	1	1,850	2,180	1.18	—	—	2,020	1.09	—	—	
		SB	5	9,250	Weaving Segment - Refer to Weave Table								
	HOV	NB	1	1,850	2,070	1.12	—	—	2,000	1.11	—	—	
		SB	1	1,850	2,240	1.21	—	—	2,000	1.08	—	—	
Studebaker Road to I-405 NB Off Ramp	GP	NB	4	7,400	8,510	1.15	— ^a	F	10,380	1.40	— ^a	F	
		SB	5	9,250	8,740	0.94	30.7	D	9,000	0.98	58.5	E	
	HOV	NB	1	1,850	2,110	1.30	—	—	1,990	1.08	—	—	
		SB	1	1,850	2,240	1.21	—	—	2,010	1.09	—	—	
I-405 NB Off Ramp to 7th St Off Ramp	GP	NB	1	7,400	7,260	0.98	38.4	E	8,800	1.26	— ^a	F	
		SB	1	7,400	7,180	1.01	34.3	D	8,030	1.05	— ^a	F	
	HOV	NB	1	1,850	2,410	1.30	—	—	1,990	1.08	—	—	
		SB	1	1,850	2,140	1.16	—	—	2,030	1.05	—	—	
7th St Off Ramp to I-405 SB On Ramp	GP	NB	4	7,400	7,290	0.96	38.4	E	8,800	1.20	— ^a	F	
		SB	1	7,400	7,180	1.00	33.6	D	7,810	1.07	44.6	E	
	HOV	NB	1	1,850	2,430	1.30	—	—	1,990	1.08	—	—	
		SB	1	1,850	2,140	1.16	—	—	2,030	1.09	—	—	
I-405 Mainline													
Carson Street to Spring Street	GP	NB	1	7,400	6,140	0.83	27.0	D	7,450	1.01	38.5	E	
		SB	4	7,400	7,890	1.07	30.1	E	7,410	1.00	39.1	E	
	HOV	NB	1	1,850	1,390	0.86	—	—	1,580	1.07	—	—	
		SB	1	1,850	1,300	1.03	—	—	1,780	0.95	—	—	
Spring Street to Willow Street/Catalina Avenue	GP	NB	1	7,400	5,360	0.72	21.9	C	6,410	0.97	27.0	D	
		SB	1	7,400	6,800	0.93	29.8	D	6,010	0.91	21.9	C	
	HOV	NB	1	1,850	1,850	1.00	—	—	2,430	1.31	—	—	
		SB	1	1,850	2,200	1.19	—	—	1,890	1.03	—	—	
Willow Street/Catalina Avenue CD Road On Ramp to I-405	GP	NB	5	9,250	5,330	0.56	17.6	B	6,630	0.72	24.0	C	
		SB	4	7,400	5,770	0.78	24.8	C	5,220	0.71	24.0	C	
	HOV	NB	1	1,850	1,480	0.80	—	—	1,990	1.08	—	—	
		SB	1	1,850	1,400	0.75	—	—	1,980	0.93	—	—	
7th Street Mainline													
Pepper Tree Lane to Studebaker Road	GP	EB	2	3,700	3,140	0.85	30.9	B	2,710	0.74	14.7	B	
		WB	2	3,700	3,890	0.72	21.2	C	2,500	0.52	15.5	B	
Studebaker Road to I-405	GP	EB	2	3,700	4,410	1.19	—	—	3,530	0.90	33.8	D	
		WB	2	3,700	4,240	1.13	48.8	E	4,030	1.09	38.8	F	

Notes:

1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS): General Purpose (GP) lane LOS is based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS F.
4. Peak hour capacities for freeway lanes include 1,850 vph for each GP lane and a single high occupancy vehicle (HOV) lane.
5. ^a Density is in excess of 45 pc/mi/ln; therefore LOS is F.

Long Beach Area Traffic Study

I-405 Improvement Project Supplemental Traffic Study

Table 4.4-6: Alternative 1 (Year 2020) Ramp Junction Peak Hour Level of Service												
Interchange	Ramp Type	Ramp Lanes	Ramp Capacity ^{1,4}	AM Peak				PM Peak				LOS ²
				Ramp		Ramp Junction	Ramp	Ramp Junction				
				Traffic Volume ¹	D/C			Density ²	Traffic Volume ¹	D/C	Density ²	
I-405 Ramp Junctions												
Lakewood Blvd & Willow St	NB Off Direct	2	3,000	990	0.33	13.8	B	950	0.32	15.0	F	
	NB On Loop	1	1,500	790	0.53	44.9	F	610	0.41	52.1	F	
	NB On Direct	1	1,500	570	0.38	24.8	C	320	0.21	28.1	D	
	SB Off (Direct + Loop)	2	3,000	1,110	0.37	17.5	B	1,360	0.45	20.0	F	
Bellflower Blvd & Los Coyotes Diagonal	SB On Loop	1	1,500	310	0.21	42.6	F	380	0.25	43.1	F	
	SB On Direct (from Willow St)	1	1,500	430	0.29	22.1	C	610	0.41	22.4	C	
	NB Off Direct	1	1,500	520	0.35	26.9	C	590	0.39	33.1	F	
	NB On (Direct + Loop)	2	3,000	1,200	0.40	13.9	F	830	0.28	13.8	F	
Woodruff Ave	SB Off (Direct + Loop)	2	3,000	1,450	0.48	17.4	B	1,560	0.65	21.8	C	
	SB On (Direct + Loop)	1	1,500	930	0.62	35.0	F	1,410	0.94	33.9	F	
	NB Off Direct	1	1,500	600	0.40	23.3	C	300	0.20	25.9	C	
	NB On Direct	1	1,500	470	0.31	34.8	F	320	0.21	42.5	F	
Palo Verde Ave & Stearns St	SB Off Direct	1	1,500	760	0.51	29.3	D	600	0.40	29.6	D	
	SB On Direct	1	1,500	640	0.43	23.1	F	290	0.19	24.7	F	
	NB Off Direct	1	1,500	690	0.46	24.5	C	800	0.53	30.5	F	
	NB On Loop	1	1,500	230	0.15	52.4	F	290	0.19	52.1	F	
Studebaker Rd	SB On Direct (from Stearns St)	1	1,500	490	0.33	26.4	F	590	0.39	26.4	F	
	NB On Direct	1	1,500	270	0.18	55.1	F	280	0.19	65.5	F	
	SB Off Direct	1	1,500	410	0.27	35.4	E	310	0.21	35.7	E	
	SB Off Direct	1	1,500	80	0.05	34.6	D	120	0.08	37.2	F	

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GL-9 (Continued)

GL-9 (Continued)

Improvement Project Supplemental Traffic Study Long Beach Area Traffic Study

Table 4.4-6: Alternative 1 (Year 2020) Ramp Junction Peak Hour Level of Service											
Interchange	Ramp Type	Ramp Lanes	Ramp Capacity ^{1,4}	Alternative 1 (Year 2020) Conditions							
				AM Peak		PM Peak		PM Peak			
				Ramp	D/C	Traffic Volume ⁵	Density ²	LOS ^{3,5}	Traffic Volume ⁵	Density ²	LOS ^{3,5}
I-605 Ramp Junctions											
Carson St	NB Off Direct	1	1,500	1,010	0.67	33.4	D	960	0.64	38.8	E
	NB On Loop	1	1,500	450	0.30	21.0	C	570	0.35	25.2	C
	NB On Direct	1	1,500	770	0.51	21.1	C	690	0.46	24.2	C
	SB Off Direct	2	3,000	1,710	0.40	13.7	B	1,390	0.46	14.4	B
	SB On Loop	1	1,500	530	0.35	22.3	C	440	0.29	21.4	C
	SB On Direct	1	1,500	270	0.18	22.9	C	330	0.23	21.7	C
Spring St/Carroll Ave	NB On Loop	1	1,500	780	0.52	18.9	B	1,090	0.73	20.5	C
	SB Off Direct	1	1,500	1,000	0.68	35.0	E	1,410	0.94	35.6	E
Willow St/Katella Ave	NB Off Direct + Loop	1	1,500	1,060	0.71	0.6	A	1,630	1.09	7.1	A
	NB On Direct	1	1,500	1,100	0.73	20.3	C	1,400	0.93	22.5	C
	SB Off Direct	1	1,500	960	0.57	34.7	D	570	0.38	31.1	D
	SB Off Loop	1	1,500	1,120	0.75	35.3	E	1,020	0.68	31.1	D
	SB On Direct (Direct + Loop)	1	1,500	590	0.39	24.2	C	800	0.53	21.9	C
	SB On Direct	1	1,500	590	0.39	24.2	C	800	0.53	21.9	C
7th Street Ramp Junctions											
Stadler Rd	EB Off Loop	1	1,500	110	0.07	34.1	D	610	0.41	30.1	D
	EB On Loop	1	1,500	1,270	0.85	40.0	F	1,420	0.95	33.1	D
	WB Off Loop	1	1,500	790	0.53	43.8	F	1,440	0.96	41.7	F
	WB On Loop	1	1,500	550	0.37	30.3	D	390	0.26	21.0	C

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I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.4-6: Alternative 1 (Year 2020) Ramp Junction Peak Hour Level of Service										
Interchange	Ramp Type	Ramp Lanes	Ramp Capacity ^{1,4}	Alternative 1 (Year 2020) Conditions						
				AM Peak			PM Peak			
				Ramp	Ramp Junction	Ramp	Ramp Junction	Density ²	LOS ^{3,5}	Density ²
Freeway-to-Freeway Branch Connectors ⁷										
I-405/I-505 Freeway Interchanges	I-505 SB to I-405 NB	1	1,800	800	0.44	--	--	1,000	0.56	--
	I-605 SB/7th St to I-405 NB	2	3,600	1,550	0.43	--	--	1,980	0.41	--
	I-405 SB to I-505 NB	2	3,600	2,290	0.56	--	--	1,060	0.29	--
	I-605 SB to 7th St/I-405 SB	2	3,600	4,970	1.38	--	--	4,230	1.18	--
	I-605 SB/I-405 SB to 7th St	1	1,800	2,150	1.19	--	--	1,120	0.62	--
	7th St to I-605 NB/I-405 NB	2	3,600	1,120	0.31	--	--	1,230	0.34	--

- Notes:
1. Peak hour capacity and traffic demand forecast volumes are shown in vehicles per hour (vph).
 2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
 3. Level of Service (LOS) is based on density (pc/mi/ln); D/C - demand-to-capacity ratio.
 4. Peak hour capacities for freeway ramps include 1,500 vph for each freeway ramp lane and 1,800 vph for each freeway-to-freeway branch connector lane.
 5. LOS F is the total flow of the merge/diverge area exceeds the capacity of the freeway segment; the density is not applicable in this case.
 6. * Per Highway Capacity Manual, as the impact area of merge and diverge is primarily focused on an influence area of 1,500 ft, the density was not calculated for areas exceeding 1,500 ft in length.
 7. For freeway-to-freeway branch connectors, D/C ratios are provided.

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.4-7: Alternative 1 (Year 2020) Weaving Level-of-SERVICE
Freeway and Collector-Distributor Roads

Weaving Segment	AM Peak Hour		PM Peak Hour	
	Density ¹	LOS ²	Density ¹	LOS ²
Freeway Mainline				
I-405 Southbound - Lakewood Boulevard/Willow Street to Bellflower Boulevard	45.3	F	75.7	F
I-405 Northbound - Bellflower Boulevard to Lakewood Boulevard/Willow Street	47.6	F	42.5	E
I-405 Southbound - Bellflower Boulevard to Woodruff Avenue	41.1	E	67.0	F
I-405 Northbound - Woodruff Avenue to Bellflower Boulevard	52.6	F	49.7	F
I-405 Northbound - Palo Verde Avenue/Stearns Street to Woodruff Avenue	46.6	F	41.8	E
I-405 Southbound - Palo Verde Avenue/Stearns Street to Studebaker Road	33.4	D	43.9	F
I-405 Northbound - Studebaker Road to Palo Verde Avenue/Stearns Street	44.2	F	45.1	F
Collector-Distributor (C-D) Roads				
Lakewood Boulevard/Willow Street Interchange at I-405				
Southbound C-D Road	18.1	B	22.5	C
Bellflower Boulevard/Los Coyotes Diagonal Interchange at I-405				
Southbound C-D Road	5.0	A	5.0	A

Notes:

1. Density is shown in passenger cars/mile/lane (pc/mi/ln).
2. Level of Service (LOS) is based on density (pc/mi/ln). The density LOS thresholds are different for the freeway mainline and collector-distributor roads.

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.4-8: Alternative 1 (Year 2040) Mainline Peak Hour Level of Service

Location	Lane Type	Direction	Mainline		Alternative 1 (Year 2040) Conditions							
			Lanes	Capacity ^{1,2}	AM Peak Hour				PM Peak Hour			
					Traffic Demand Volume ³	D/C	Density ⁴	LOS ⁵	Traffic Demand Volume ³	D/C	Density ⁴	LOS ⁵
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Willow Street	GP	NB	5	9,250	10,815	1.11	—	F	11,240	1.22	—	F
		SB	5	9,250	10,480	1.13	—	F	10,880	1.17	—	F
	HOV	NB	1	1,850	2,240	1.21	—	—	2,140	1.16	—	—
		SB	1	1,850	2,160	1.17	—	—	2,210	1.25	—	—
Lakewood Boulevard/Willow Street to Bellflower Boulevard	GP	NB	5	9,250	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—
	HOV	NB	1	1,850	2,320	1.20	—	—	2,210	1.19	—	—
		SB	1	1,850	2,180	1.17	—	—	2,310	1.25	—	—
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	9,250	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—
	HOV	NB	1	1,850	2,220	1.20	—	—	2,250	1.19	—	—
		SB	1	1,850	2,150	1.19	—	—	2,310	1.25	—	—
Woodruff Avenue to Palo Verde Avenue/Stearns Street	GP	NB	5	9,250	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—
	HOV	NB	1	1,850	2,240	1.21	—	—	2,220	1.19	—	—
		SB	1	1,850	2,180	1.27	—	—	2,180	1.18	—	—
Palo Verde Avenue/Stearns Street to Studebaker Road	GP	NB	5	9,250	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—
	HOV	NB	1	1,850	2,240	1.21	—	—	2,210	1.18	—	—
		SB	1	1,850	2,120	1.11	—	—	2,280	1.25	—	—
Studebaker Road to I-405 NB Off Ramp	GP	NB	4	7,400	9,576	1.27	—	F	9,520	1.29	—	F
		SB	1	1,850	2,240	1.21	—	—	2,210	1.19	—	—
	HOV	NB	1	1,850	2,180	1.17	—	—	2,380	1.18	—	—
		SB	1	1,850	2,120	1.11	—	—	2,280	1.25	—	—
I-405 NB Off Ramp to 7th St Off Ramp	GP	NB	3	2,850	2,240	1.22	—	—	2,210	1.25	—	—
		SB	1	1,850	2,120	1.11	—	—	2,280	1.25	—	—
	HOV	NB	1	1,850	2,060	1.41	—	—	2,150	1.12	—	—
		SB	1	1,850	2,080	1.60	43.2	F	4,270	1.12	—	F
7th St Off Ramp to I-405 SB On Ramp	GP	NB	4	7,400	7,830	1.06	43.9	E	9,820	1.20	—	F
		SB	4	7,400	7,980	1.08	58.3	F	8,340	1.10	—	F
	HOV	NB	1	1,850	2,810	1.41	—	—	3,750	1.16	—	—
		SB	1	1,850	2,890	1.25	—	—	2,170	1.17	—	—
I-405 Mainline												
Clarkson Street to Spring Street	GP	NB	4	7,400	6,440	0.90	29.9	D	6,120	1.09	—	F
		SB	4	7,400	6,530	1.15	—	F	8,010	1.08	—	E
	HOV	NB	1	1,850	1,720	0.93	—	—	2,140	1.16	—	—
		SB	1	1,850	2,050	1.11	—	—	1,920	1.04	—	—
Spring Street to Willow Street/Katella Avenue	GP	NB	4	7,400	8,790	0.76	22.8	C	6,830	0.84	30.2	D
		SB	4	7,400	7,420	1.00	33.9	D	6,500	0.86	27.5	D
	HOV	NB	1	1,850	2,000	1.08	—	—	2,410	1.41	—	—
		SB	1	1,850	2,320	1.18	—	—	2,240	1.10	—	—
Willow Street/Katella Avenue CD Road On Ramp to I-405	GP	NB	5	9,250	8,750	0.62	19.0	—	7,130	0.78	20.0	D
		SB	4	7,400	6,240	0.94	27.2	D	6,880	0.76	26.9	D
	HOV	NB	1	1,850	2,000	1.08	—	—	2,380	1.42	—	—
		SB	1	1,850	1,520	0.82	—	—	1,060	0.57	—	—
7th Street Mainline												
Pepper Tree Lane to Studebaker Road	GP	EB	2	3,700	3,560	0.85	18.5	B	2,790	0.74	14.7	B
		WB	3	5,550	4,980	0.72	21.3	C	2,800	0.52	15.5	B
Studebaker Road to I-405	GP	EB	2	3,700	4,410	1.19	—	F	3,630	0.88	31.8	D
		WB	3	5,700	4,240	1.15	43.9	E	4,010	1.02	38.9	E

Notes:

1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS) General Purpose (GP) lane LOS is based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS F.
4. Peak hour capacities for Freeway Series include 1,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
5. * Density is in excess of 45 pc/mi/ln; therefore LOS is F.

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GL-9 (Continued)

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study Long Beach Area Traffic Study

Table 4.4-9: Alternative 1 (Year 2040) Ramp Junction Peak Hour Level of Service

Interchange	Ramp Type	Ramp Lanes Capacity	Alternative 1 (Year 2040) Conditions									
			AM Peak				PM Peak					
			Ramp	Ramp Junction	Density ²	LOS ³	Traffic Volume ¹	D/C	Ramp	Ramp Junction	Density ²	LOS ³
I-405 Ramp Junctions												
Lakewood Blvd & Willow St	NB Off Direct	2	3,000	1,070	0.36	15.9	B	1,020	0.34	18.3	F	
	NB On Loop	1	1,500	860	0.57	48.1	F	660	0.44	56.1	F	
	NB On Direct	1	1,500	610	0.41	26.7	F	340	0.23	30.4	F	
	SB Off (Direct + Loop)	2	3,000	1,200	0.40	19.7	B	1,470	0.49	22.5	F	
	SB On Loop	1	1,500	340	0.23	46.0	F	410	0.27	46.4	F	
Bellflower Blvd & Los Coyotes Diagonal	SB On Direct (from Willow St)	1	1,500	460	0.31	23.6	C	660	0.44	23.8	F	
	NB Off Direct	1	1,500	560	0.37	29.5	D	630	0.42	36.1	F	
	NB On (Direct + Loop)	2	3,000	1,300	0.43	15.9	F	900	0.30	15.8	F	
	SB Off (Direct + Loop)	2	3,000	1,570	0.52	19.8	B	2,120	0.71	24.6	F	
	SB On (Direct + Loop)	1	1,500	1,010	0.67	37.1	F	1,520	1.01	35.5	F	
Woodruff Ave	NB Off Direct	1	1,500	640	0.43	25.9	C	330	0.22	29.9	F	
	NB On Direct	1	1,500	510	0.34	37.2	F	340	0.23	45.7	F	
	SB Off Direct	1	1,500	820	0.55	32.1	D	650	0.43	32.4	D	
	SB On Direct	1	1,500	700	0.47	24.0	F	320	0.21	26.1	F	
	NB Off Direct	1	1,500	750	0.50	27.3	C	860	0.57	33.8	F	
Palo Verde Ave & Steam St	NB On Loop	1	1,500	250	0.17	56.9	F	320	0.21	67.2	F	
	SB On Direct (from Steam St)	1	1,500	530	0.35	27.7	F	640	0.43	27.7	F	
	NB On Direct	1	1,500	300	0.20	59.7	F	310	0.21	70.9	F	
Shudbaker Rd	SB Off Direct	1	1,500	450	0.30	38.1	E	310	0.22	38.4	F	
	SB On Direct	1	1,500	80	0.05	37.1	E	130	0.09	40.1	F	
	7th St											

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I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.4-9: Alternative 1 (Year 2040) Ramp Junction Peak Hour Level of Service

Interchange	Ramp Type	Ramp Lanes Capacity	Alternative 1 (Year 2040) Conditions								
			AM Peak			PM Peak					
			Ramp	Ramp Junction	LOS ³	Ramp	Ramp Junction	LOS ³			
			Traffic Volume ¹	D/C	Density ²	LOS ³	Traffic Volume ¹	D/C	Density ²	LOS ³	
I-605 Ramp Junctions											
Carson St	NB Off Direct	1	1,500	1,090	0.73	35.9	E	1,030	0.69	41.8	F
	NB On Loop	1	1,500	490	0.33	22.2	C	560	0.37	26.7	C
	NB On Direct	1	1,500	830	0.55	22.1	C	740	0.49	25.3	F
	SB Off Direct	2	3,000	1,300	0.43	15.8	B	1,500	0.50	16.6	B
	SB On Loop	1	1,500	570	0.38	23.4	C	480	0.32	22.5	C
Spring St/Cerritos Ave	SB On Direct	1	1,500	290	0.19	24.2	F	380	0.25	22.8	C
	NB On Loop	1	1,500	840	0.56	19.6	B	1,170	0.78	21.1	F
	SB Off Direct	1	1,500	1,110	0.74	37.7	E	1,520	1.01	38.3	E
	NB Off (Direct + Loop)	1	1,500	1,140	0.76	2.5	A	1,760	1.17	9.7	A
	NB On Direct	1	1,500	1,190	0.79	21.3	C	1,520	1.01	23.4	C
Willow St/Katella Ave	SB Off Direct	1	1,500	610	0.41	37.3	E	620	0.41	33.5	D
	SB On Loop	1	1,500	1,210	0.81	38.0	E	1,110	0.74	33.5	D
	SB On Direct (Direct + Loop)	1	1,500	630	0.42	25.8	C	870	0.58	23.3	C
7th Street Ramp Junctions											
Studebaker Rd	EB Off Loop	1	1,500	120	0.08	34.1	D	680	0.44	30.1	D
	EB On Loop	1	1,500	1,370	0.91	40.9	F	1,540	1.03	34.0	D
	WB Off Loop	1	1,500	850	0.57	43.8	F	1,560	1.04	41.7	F
	WB On Loop	1	1,500	600	0.40	30.7	D	430	0.29	21.3	C

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GL-9 (Continued)

GL-9 (Continued)

Long Beach Area Traffic Study

Table 4.4-9: Alternative 1 (Year 2040) Ramp Junction Peak Hour Level of Service

Interchange	Ramp Type	Ramp Lanes	Ramp Capacity ^{1,4}	Alternative 1 (Year 2040) Conditions							
				AM Peak			PM Peak				
				Ramp	Ramp Junction	Ramp	Ramp Junction	Density ²	Traffic Volume ¹	Density ²	Traffic Volume ¹
Freeway - to - Freeway Branch Connectors ⁷											
I-405/ 605 Freeway Interchanges	I-605 SB to I-405 NB	1	1,800	870	0.48	--	--	1,080	0.60	--	--
	I-605 SB/7th St to I-405 NB	2	3,600	1,570	0.46	--	--	1,600	0.44	--	--
	I-405 SB to I-605 NB	2	3,600	1,390	0.38	--	--	1,560	0.43	--	--
	I-605 SB to 7th St/I-405 SB	2	3,600	5,380	1.49	--	--	4,570	1.27	--	--
	I-605 SB/I-405 SB to 7th St	1	1,800	2,150	1.13	--	--	1,120	0.62	--	--
	7th St to I-605 NB/I-405 NB	2	3,600	1,200	0.33	--	--	1,330	0.37	--	--
7th St to I-405 NB	1	1,800	810	0.45	--	--	--	470	0.26	--	--

- Notes:
1. Peak hour capacity and traffic demand forecast volumes are shown in vehicles per hour (vph).
 2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
 3. Level of Service (LOS) is based on density (pc/mi/ln); D/C - demand-to-capacity ratio.
 4. Peak hour capacities for freeway ramps include 1,500 vph for each freeway ramp lane and 1,800 vph for each freeway-to-freeway branch connector lane.
 5. LOS F as the total flow of the merge/diverge area exceeds the capacity of the freeway segment; the density is not applicable in this case.
 6. * Per Highway Capacity Manual, as the impact area of merge and diverge is primarily focused on an influence area of 1,500 ft, the density was not calculated for areas exceeding 1,500 ft in length.
 7. For freeway-to-freeway branch connectors, D/C ratios are provided.

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I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.4-10: Alternative 1 (Year 2040) Weaving Level-of-Service
Freeway and Collector-Distributor Roads

Weaving Segment	AM Peak Hour		PM Peak Hour	
	Density ¹	LOS ²	Density ¹	LOS ²
Freeway Mainline				
I-405 Southbound - Lakewood Boulevard/Willow Street to Bellflower Boulevard	49.9	F	78.5	F
I-405 Northbound - Bellflower Boulevard to Lakewood Boulevard/Willow Street	52.3	F	46.5	F
I-405 Southbound - Bellflower Boulevard to Woodruff Avenue	45.6	F	73.7	F
I-405 Northbound - Woodruff Avenue to Bellflower Boulevard	58.3	F	53.2	F
I-405 Northbound - Palo Verde Avenue/Stearns Street to Woodruff Avenue	51.3	F	46.2	F
I-405 Southbound - Palo Verde Avenue/Stearns Street to Studebaker Road	36.5	E	48.0	F
I-405 Northbound - Studebaker Road to Palo Verde Avenue/Stearns Street	48.8	F	55.1	F
Collector-Distributor (C-D) Roads				
Lakewood Boulevard/Willow Street Interchange at I-405				
Southbound C-D Road	18.1	B	22.5	C
Bellflower Boulevard/Los Coyotes Diagonal Interchange at I-405				
Southbound C-D Road	5.0	A	5.0	A

- Notes:
1. Density is shown in passenger cars/mile/lane (pc/mi/ln).
 2. Level of Service (LOS) is based on density (pc/mi/ln). The density LOS thresholds are different for the freeway mainline and collector-distributor roads.

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R2-GL-129

March 2015

1984

Long Beach Area Traffic Study

Table 4.4-13: Year 2010 Alternative 2 vs Year 2020 Feasible Alternatives Modeling Comparison

[illegible]

Group Gender Integration Activity

GL-9 (Continued)

Large Swallow-Tailed Petrels

Table 4.4-14: Year 2040 Alternative 1 vs. Year 2040 No-Build Alternative Maximum Comparison

[illegible]

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.5-1 Alternative 2 (Year 2020) Intersection Level of Service - AM/PM Peak Hours									
No.	Location		Traffic Control/Comments	Alternative 1 (Year 2020) LOS					
	East/West Street	North/South Street		AM Peak Hour			PM Peak Hour		
				D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS
1	Carson St	I-405 SB Off Ramp	Existing Traffic Signal	0.58	19.3	B	0.67	20.3	C
		I-405 SB Direct On Ramp	Unsignalized On Ramp	0.24	--	--	0.32	--	--
2	Carson St	I-405 SB Loop On Ramp	Unsignalized On Ramp	0.37	--	--	0.36	--	--
		I-405 NB Off Ramp	Existing Traffic Signal	0.60	20.1	C	0.75	18.5	B
		I-405 NB Loop On Ramp	Unsignalized On Ramp	0.33	--	--	0.35	--	--
3	Carson St	I-405 NB Direct On Ramp	Unsignalized On Ramp	0.51	--	--	0.45	--	--
4	Carson St	Pioneer Blvd	Existing Traffic Signal	0.78	34.4	C	0.84	31.2	C
5	Spring St/Cerritos Ave	I-405 SB Off Ramp	Existing Traffic Signal	0.68	14.5	B	0.57	9.8	A
6	Spring St/Cerritos Ave	I-405 NB On Ramp	Existing Traffic Signal	0.69	7.8	A	0.74	7.7	A
	I-405 NB Direct Off Ramp		Unsignalized Off Ramp	0.42	--	--	0.42	--	--
	I-405 NB Direct On Ramp		Unsignalized On Ramp	0.39	--	--	0.20	--	--
	I-405 NB Loop Off Ramp		Unsignalized Off Ramp	0.23	--	--	0.28	--	--
7	I-405 NB Loop On Ramp	Lakewood Blvd	Unsignalized On Ramp	0.54	--	--	0.41	--	--
	I-405 SB Loop On Ramp		Unsignalized On Ramp	0.22	--	--	0.25	--	--
8	I-405 SB Direct Off Ramp	Lakewood Blvd	Unsignalized Off Ramp	0.42	--	--	0.47	--	--
9	Willow St	Lakewood Blvd	Existing Traffic Signal	0.75	28.3	C	0.90	44.3	D
		I-405 SB Loop Off Ramp	Unsignalized Off Ramp	0.33	--	--	0.45	--	--
10	Willow St	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.31	--	--	0.43	--	--
	I-405 NB Off Ramp		Existing Traffic Signal	0.52	10.5	B	0.53	11.6	B
	I-405 NB Loop On Ramp		Unsignalized On Ramp	0.51	--	--	0.35	--	--
11	I-405 NB Direct On Ramp	Bellflower Blvd	Unsignalized On Ramp	0.30	--	--	0.18	--	--
12	Willow St	Bellflower Blvd	Existing Traffic Signal	0.98	39.0	D	1.15	78.7	E
		Bellflower Blvd	Existing Traffic Signal	0.62	27.4	C	1.03	41.2	D
13	Los Coyotes Diagonal	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.08	--	--	0.14	--	--
14	I-405 SB Loop Off Ramp	Bellflower Blvd	Unsignalized On Ramp	0.12	--	--	0.25	--	--
		I-405 SB Direct Off Ramp	Existing Traffic Signal	0.52	10.4	B	0.48	14.1	B
15	Los Coyotes Diagonal	I-405 SB Loop On Ramp	Unsignalized On Ramp	0.31	--	--	0.20	--	--
16	Willow St	Los Coyotes Diagonal	Existing Traffic Signal	0.88	54.7	D	1.25	79.6	E
17	Willow St	Woodruff Ave	Existing Traffic Signal	1.41	203.6	F	0.88	54.3	D
	I-405 NB Direct Off Ramp		Unsignalized Off Ramp	0.44	--	--	0.23	--	--
18	I-405 NB Direct On Ramp	Woodruff Ave	Unsignalized On Ramp	0.29	--	--	0.21	--	--
	I-405 SB Direct Off Ramp		Unsignalized Off Ramp	0.51	--	--	0.46	--	--
19	I-405 SB Direct On Ramp	Woodruff Ave	Unsignalized On Ramp	0.44	--	--	0.26	--	--
	I-405 NB Direct Off Ramp		Existing Traffic Signal	0.69	15.3	B	0.59	11.8	B
20	I-405 NB Loop On Ramp	Palo Verde	Unsignalized On Ramp	0.10	--	--	0.19	--	--
21	Woodruff Ave	Palo Verde	Existing Traffic Signal	0.82	13.8	B	0.70	11.3	B
22	Stearns St	Palo Verde	Existing Traffic Signal	0.83	17.9	B	0.83	20.2	C
23	Stearns St	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.29	--	--	0.40	--	--
24	I-405 NB Direct On Ramp	Studebaker Rd	Existing Traffic Signal	0.54	3.3	A	0.52	2.7	A
25	I-405 SB Direct Off Ramp	Studebaker Rd	Unsignalized Intersection	0.90	61.5	F	0.61	31.4	D
26	Atherton St	Studebaker Rd	Existing Traffic Signal	0.59	8.5	A	0.79	15.0	B
27	SR-22 WB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.49	13.0	B	0.88	28.9	C
28	SR-22 EB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.97	30.9	C	0.98	30.1	C
29	SR-22 WB On/Off Ramp	College Park Dr	Unsignalized Intersection	0.62	28.6	D	1.14	172.9	F
30	7th St	Pacific Coast Highway	Existing Traffic Signal	0.96	51.2	D	0.99	58.9	D
31	7th St	Bellflower Blvd	Existing Traffic Signal	1.09	74.9	E	0.98	46.3	D
32	Pacific Coast Highway	Bellflower Blvd	Existing Traffic Signal	0.51	39.7	D	0.64	19.3	B
33	7th St	Channel Dr	Existing Traffic Signal	0.73	24.0	C	0.96	24.8	C
34	7th St	W. Campus Dr	Existing Traffic Signal	0.82	45.2	D	0.83	41.7	D
35	7th St	E. Campus Dr	Existing Traffic Signal	1.07	46.4	D	0.90	16.1	B

PARSONS

Orange County Transportation Authority

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.5-2 Alternative 2 (Year 2020) Intersection Queues vs Storage - AM/PM Peak Hours									
No.	Location		Movement	Available Storage (ft)	2020 Alternative 2 Conditions				
	East/West Street	North/South Street			AM Peak Hour		PM Peak Hour		
					95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	
1	Carson St	I-405 SB Off Ramp	SBL	300	203	Yes	335	No	
			SBT	1,130	126	Yes	183	Yes	
			SBR	300	256	Yes	195	Yes	
3	Carson St	I-405 NB Off Ramp	NBL	300 (650)	230	Yes	285	Yes	
			NBR	300 (1175)	270	Yes	155	Yes	
4	Carson St	Pioneer Blvd	NBL	120	315	No	332	No	
			SBL	140	57	Yes	72	Yes	
			SBR	140	77	Yes	85	Yes	
			EBL	250	297	No	372	No	
			WBL	80	15	Yes	16	Yes	
5	Spring St/Cerritos Ave	I-405 SB Off Ramp	SBL	220 (1240)	274	Yes	155	Yes	
			SBR	900	0	Yes	0	Yes	
6	Spring St/Cerritos Ave	I-405 NB On Ramp	WBL	260	196	Yes	145	Yes	
			NBL	180	130	Yes	137	Yes	
			SBL	150	50	Yes	113	Yes	
			FBL	175	56	Yes	74	Yes	
			WBL	150	30	Yes	143	Yes	
9	Willow St	Lakewood Blvd	WBL	1,870	102	Yes	181	Yes	
11	I-405 NB Off Ramp	Bellflower Blvd	WBL/T/R	1,130	39	Yes	182	Yes	
			WBR	410	55	Yes	165	Yes	
12	Willow St	Bellflower Blvd	NBL	150	289	No	79	Yes	
			SBL	120	189	No	246	No	
			EBL	140	147	No	125	Yes	
			WBL	110	188	No	311	No	
13	Los Coyotes Diagonal	Bellflower Blvd	NBL	160	23	Yes	43	Yes	
			NBR	230	49	Yes	147	Yes	
			EBL	190	316	No	583	No	
			WBL	150	197	No	207	No	
15	Los Coyotes Diagonal	I-405 SB Direct Off Ramp	SBL	1523 (500)	137	Yes	260	Yes	
			SBL	120	166	No	355	No	
16	Willow St	Los Coyotes Diagonal	EBL	140	159	No	54	Yes	
			WBL	160	329	No	697	No	
			NBL	140	982	No	393	No	
			NBR	60	22	Yes	9	Yes	
			SBL	120	74	Yes	29	Yes	
			SBR	120	211	No	56	Yes	
			EBL	200	351	No	411	No	
			WBL	180	191	No	108	Yes	
20	I-405 NB Direct Off Ramp	Palo Verde	WBL	550	327	Yes	172	Yes	
			WBL/T/R	1,135	68	Yes	236	Yes	
21	Woodruff Ave	Palo Verde	EBL	335	257	Yes	207	Yes	
			EBR	885	290	Yes	227	Yes	
			NBL	130	161	No	165	No	
			SBL	120	92	Yes	112	Yes	
			EBL	90	168	No	164	No	
			WBL	80	44	Yes	112	No	
22	Stearns St	Palo Verde	NBL	100	68	Yes	51	Yes	
			SBR	70	16	Yes	16	Yes	
24	I-405 NB Direct On Ramp	Studebaker Rd	NBL	100	68	Yes	51	Yes	
			SBR	70	16	Yes	16	Yes	

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Orange County Transportation Authority

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.5-2 Alternative 2 (Year 2020) Intersection Queues vs Storage - AM/PM Peak Hours								
No.	Location		Movement	Available Storage (ft)	2020 Alternative 2 Conditions			
	East/West Street	North/South Street			AM Peak Hour		PM Peak Hour	
					95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
26	Athenon St	Studebaker Rd	NBL	200	55	Yes	56	Yes
			SBL	260	1	Yes	4	Yes
			SBR	70	16	Yes	21	Yes
			EBL	120	79	Yes	223	No
			WBL	220	29	Yes	26	Yes
27	SR-22 WB On/Off Ramp	Studebaker Rd	NBR	150	14	Yes	23	Yes
			SBL	200	81	Yes	226	No
28	SR-22 EB On/Off Ramp	Studebaker Rd	NBR	300	1212	No	1035	No
			SBL	150	368	No	242	No
			WBR	60	62	No	223	No
30	7th St	Pacific Coast Highway	NBL	330	155	Yes	239	Yes
			SBL	290	288	Yes	390	No
31	7th St	Bellflower Blvd	NBR	130	99	Yes	40	Yes
			SBL	160	196	No	237	No
			SBR	160	87	Yes	352	No
			EBL	200	401	No	395	No
			WBL	200	36	Yes	58	Yes
32	Pacific Coast Highway	Bellflower Blvd	NBL	280	88	Yes	70	Yes
			SBL	240	226	Yes	208	Yes
			SBR	60	27	Yes	31	Yes
			EBL	110	54	Yes	118	No
			WBL	120	53	Yes	59	Yes
33	7th St	Channel Dr	WBR	200	65	Yes	41	Yes
			EBL	270	107	Yes	27	Yes
			EBR	180	22	Yes	6	Yes
34	7th St	W Campus Dr	WBL	280	105	Yes	258	Yes
			SBL/R	150	70	Yes	212	No
35	7th St	E. Campus Dr	EBL	400	80	Yes	24	Yes
			SBL	150	78	Yes	183	No
			SBL/R	150	69	Yes	108	Yes
			EBL	150	207	No	95	Yes
			WBL	300	77	Yes	120	Yes

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Orange County Transportation Authority

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.5-3 Alternative 2 (Year 2040) Intersection Level of Service - AM/PM Peak Hours										
No.	Location			Alternative 1 (Year 2040) LOS						
	East/West Street	North/South Street	Traffic Control/Comments	AM Peak Hour		PM Peak Hour		D/C	Avg Delay (sec)	LOS
				D/C	Avg Delay (sec)	D/C	Avg Delay (sec)			
1	Carson St	I-605 SB Off Ramp	Existing Traffic Signal	0.63	19.3	B	0.73	21.0	C	
2	Carson St	I-605 SB Direct On Ramp	Unsignalized On Ramp	0.26	--	--	0.34	--	--	
		I-605 SB Loop On Ramp	Unsignalized On Ramp	0.40	--	--	0.39	--	--	
		I-605 NB Off Ramp	Existing Traffic Signal	0.65	21.9	C	0.81	18.1	B	
3	Carson St	I-605 NB Loop On Ramp	Unsignalized On Ramp	0.35	--	--	0.39	--	--	
		I-605 NB Direct On Ramp	Unsignalized On Ramp	0.55	--	--	0.49	--	--	
		Pioneer Blvd	Existing Traffic Signal	0.86	41.9	D	0.93	39.0	D	
4	Spring St/Cerritos Ave	I-605 SB Off Ramp	Existing Traffic Signal	0.74	15.2	H	0.62	10.8	B	
5	Spring St/Cerritos Ave	I-605 NB On Ramp	Existing Traffic Signal	0.75	8.7	A	0.81	8.6	A	
6	I-405 NB Direct Off Ramp	I-405 NB Direct On Ramp	Unsignalized Off Ramp	0.46	--	--	0.45	--	--	
		I-405 NB Loop Off Ramp	Unsignalized Off Ramp	0.43	--	--	0.21	--	--	
		I-405 NB Loop On Ramp	Unsignalized Off Ramp	0.25	--	--	0.25	--	--	
7	I-405 NB Loop On Ramp	Lakewood Blvd	Unsignalized On Ramp	0.58	--	--	0.44	--	--	
		I-405 SB Loop On Ramp	Unsignalized On Ramp	0.24	--	--	0.27	--	--	
		I-405 SB Direct Off Ramp	Unsignalized Off Ramp	0.45	--	--	0.51	--	--	
8	Willow St	Lakewood Blvd	Existing Traffic Signal	0.79	32.2	C	1.02	52.0	D	
		I-405 SB Loop Off Ramp	Unsignalized Off Ramp	0.36	--	--	0.49	--	--	
		I-405 SB Direct On Ramp	Unsignalized On Ramp	0.34	--	--	0.46	--	--	
9	Willow St	I-405 NB Off Ramp	Existing Traffic Signal	0.57	11.3	B	0.58	12.2	B	
		I-405 NB Loop On Ramp	Unsignalized On Ramp	0.56	--	--	0.39	--	--	
		I-405 NB Direct On Ramp	Unsignalized On Ramp	0.32	--	--	0.19	--	--	
10	Willow St	Bellflower Blvd	Existing Traffic Signal	1.05	55.0	D	1.25	106.3	F	
11	Los Coyotes Diagonal	Bellflower Blvd	Existing Traffic Signal	0.67	27.7	C	1.13	54.2	D	
		I-405 SB Direct On Ramp	Unsignalized On Ramp	0.08	--	--	0.15	--	--	
		I-405 SB Loop Off Ramp	Unsignalized On Ramp	0.13	--	--	0.27	--	--	
12	Los Coyotes Diagonal	Bellflower Blvd	Existing Traffic Signal	0.56	11.0	B	0.52	14.8	B	
		I-405 SB Direct Off Ramp	Unsignalized On Ramp	0.33	--	--	0.21	--	--	
		I-405 SB Loop On Ramp	Unsignalized On Ramp	0.33	--	--	0.21	--	--	
13	Willow St	Los Coyotes Diagonal	Existing Traffic Signal	0.99	60.7	E	1.41	101.4	F	
14	Willow St	Woodruff Ave	Existing Traffic Signal	1.53	242.2	F	0.95	81.3	F	
15	I-405 NB Direct Off Ramp	Woodruff Ave	Unsignalized Off Ramp	0.47	--	--	0.25	--	--	
		I-405 NB Direct On Ramp	Unsignalized On Ramp	0.31	--	--	0.23	--	--	
		I-405 SB Direct Off Ramp	Unsignalized Off Ramp	0.55	--	--	0.50	--	--	
16	I-405 SB Direct On Ramp	Woodruff Ave	Unsignalized On Ramp	0.47	--	--	0.28	--	--	
		I-405 NB Direct Off Ramp	Existing Traffic Signal	0.82	17.4	B	0.72	13.3	B	
		I-405 NB Loop On Ramp	Unsignalized On Ramp	0.11	--	--	0.20	--	--	
17	Woodruff Ave	Palo Verde	Existing Traffic Signal	0.89	15.9	B	0.76	12.1	B	
18	Stearns St	Palo Verde	Existing Traffic Signal	0.91	20.3	C	0.92	23.9	C	
19	Stearns St	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.31	--	--	0.43	--	--	
20	I-405 NB Direct On Ramp	Studebaker Rd	Existing Traffic Signal	0.58	3.6	A	0.56	2.8	A	
21	I-405 SB Direct Off Ramp	Studebaker Rd	Unsignalized Intersection	1.04	81.3	F	0.65	33.1	D	
22	Athenon St	Studebaker Rd	Existing Traffic Signal	0.65	9.5	A	0.86	17.1	B	
23	SR-22 WB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.54	13.4	B	0.89	31.8	C	
24	SR-22 EB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	1.06	45.2	D	1.09	43.9	D	
25	SR-22 WB On/Off Ramp	College Park Dr	Unsignalized Intersection	0.75	38.1	E	1.59	311.8	F	
26	7th St	Pacific Coast Highway	Existing Traffic Signal	1.04	70.0	E	1.07	64.9	E	
27	7th St	Bellflower Blvd	Existing Traffic Signal	1.18	92.7	F	1.06	60.9	E	
28	Pacific Coast Highway	Bellflower Blvd	Existing Traffic Signal	0.55	40.2	D	0.74	31.4	C	
29	7th St	Channel Dr	Existing Traffic Signal	0.79	25.4	C	1.04	55.7	E	
30	7th St	W. Campus Dr	Existing Traffic Signal	0.89	68.4	E	0.90	66.0	E	
31	7th St	E. Campus Dr	Existing Traffic Signal	1.17	68.7	E	0.99	19.0	B	

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Orange County Transportation Authority

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

No.	Location		Movement	Available Storage (ft)	2040 Alternative 2 Conditions			
	East/West Street	North/South Street			AM Peak Hour		PM Peak Hour	
					95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
1	Carson St	I-605 SB Off Ramp	SBL	300	223	Yes	372	No
			SBT	1,130	139	Yes	201	Yes
			SBR	300	286	Yes	216	Yes
3	Carson St	I-605 NB Off Ramp	NBL	300 (650)	252	Yes	312	Yes
			NBR	300 (1175)	245	Yes	167	Yes
			NBL	120	348	No	366	No
4	Carson St	Pioneer Blvd	SBL	140	60	Yes	78	Yes
			SBR	140	82	Yes	88	Yes
			EBL	250	328	No	405	No
			WBL	80	15	Yes	16	Yes
			SBL	220 (1240)	289	Yes	161	Yes
5	Spring St/Cerritos Ave	I-605 SB Off Ramp	SBR	900	0	Yes	0	Yes
6	Spring St/Cerritos Ave	I-605 NB On Ramp	WBL	260	211	Yes	159	Yes
9	Willow St	Lakewood Blvd	NBL	180	140	Yes	160	Yes
			SBL	150	58	Yes	132	Yes
			EBL	175	65	Yes	85	Yes
			WBL	150	46	Yes	167	No
			WBL	1,870	109	Yes	194	Yes
11	I-405 NB Off Ramp	Bellflower Blvd	WBL/T/R	1,130	70	Yes	209	Yes
			WBR	410	66	Yes	180	Yes
			NBL	150	314	No	77	Yes
12	Willow St	Bellflower Blvd	SBL	120	206	No	258	No
			EBL	140	161	No	144	No
			WBL	110	186	No	329	No
			NBL	160	25	Yes	47	Yes
			NBR	230	50	Yes	185	Yes
13	Los Coyotes Diagonal	Bellflower Blvd	EBL	190	346	No	643	No
			WBL	150	200	No	225	No
			SBL	1525 (500)	143	Yes	277	Yes
15	Los Coyotes Diagonal	I-405 SB Direct Off Ramp	SBL	120	193	No	405	No
16	Willow St	Los Coyotes Diagonal	EBL	140	169	No	54	Yes
			WBL	160	358	No	762	No
			NBL	140	1069	No	436	No
			NBR	60	23	Yes	9	Yes
			SBL	120	81	Yes	31	Yes
17	Willow St	Woodruff Ave	SBR	120	239	No	58	Yes
			EBL	200	379	No	455	No
			WBL	180	211	No	116	Yes
			WBL	550	366	Yes	188	Yes
			WBL/T/R	1,155	89	Yes	285	Yes
21	Woodruff Ave	Palo Verde	EBL	335	304	Yes	228	Yes
22	Stearns St	Palo Verde	FBR	335	320	Yes	292	Yes
			NBL	130	177	No	181	No
			SBL	220	89	Yes	102	Yes
			EBL	90	187	No	185	No
			WBL	80	49	Yes	127	No
24	I-405 NB Direct On Ramp	Studebaker Rd	NBL	100	68	Yes	51	Yes
			SBR	70	18	Yes	17	Yes

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Orange County Transportation Authority

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

No	Location		Movement	Available Storage (ft)	2040 Alternative 2 Conditions			
	East/West Street	North/South Street			AM Peak Hour		PM Peak Hour	
					95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
26	Atherton St	Studebaker Rd	NBL	200	99	Yes	75	Yes
			SBL	260	2	Yes	4	Yes
			SBR	70	18	Yes	21	Yes
			EBL	170	85	Yes	248	No
			WBL	220	31	Yes	27	Yes
27	SR-22 WB On/Off Ramp	Studebaker Rd	NBR	130	15	Yes	24	Yes
			SBL	200	90	Yes	250	No
28	SR-22 EB On/Off Ramp	Studebaker Rd	NBR	300	1396	No	1201	No
			SBL	150	401	No	257	No
			WBR	50	64	No	312	No
30	7th St	Pacific Coast Highway	NBL	330	155	Yes	252	Yes
			SBL	280	324	No	145	No
31	7th St	Bellflower Blvd	NBR	130	133	No	45	Yes
			SBL	160	203	No	259	No
			SBR	160	90	Yes	448	No
			EBL	200	509	No	866	No
			WBL	200	36	Yes	62	Yes
32	Pacific Coast Highway	Bellflower Blvd	NBL	280	94	Yes	73	Yes
			SBL	240	275	No	203	Yes
			SBR	50	18	Yes	34	Yes
			EBL	110	55	Yes	127	No
			WBL	120	56	Yes	65	Yes
33	7th St	Channel Dr	WBR	200	75	Yes	42	Yes
			EBL	270	108	Yes	24	Yes
			EBR	180	20	Yes	59	Yes
34	7th St	W. Campus Dr	WBL	280	105	Yes	264	Yes
			SBL/T	150	75	Yes	234	No
35	7th St	E. Campus Dr	EBL	400	79	Yes	24	Yes
			SBL	150	84	Yes	213	No
			SBL/T	150	71	Yes	128	Yes
			EBL	150	210	No	99	Yes
			WBL	300	80	Yes	147	Yes

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Orange County Transportation Authority

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GL-9 (Continued)

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Location	Lane Type	Direction	Mainline		Alternative 2 (Year 2020) Conditions							
			Lanes	Capacity ^{1,4}	AM Peak Hour				PM Peak Hour			
					Traffic Demand Volume ⁵	D/C	Density ²	LOS ³	Traffic Demand Volume ⁵	D/C	Density ²	LOS ³
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Willow Street	GP	NB	5	9,290	9,500	1.04	42.1	E	20,060	1.09	45.5	E
		SB	5	9,290	9,660	1.04	35.9	E	10,030	1.08	—	F
	HOV	NB	1	1,850	2,040	1.10	—	—	2,280	1.23	—	—
		SB	1	1,850	1,930	1.04	—	—	1,810	0.98	—	—
Lakewood Boulevard/Willow Street to Bellflower Boulevard	GP	NB	5	9,290	—	—	—	—	—	—	—	—
		SB	5	9,290	—	—	—	—	—	—	—	—
	HOV	NB	1	1,850	1,980	1.07	—	—	2,240	1.21	—	—
		SB	1	1,850	1,920	1.04	—	—	1,810	0.98	—	—
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	9,290	—	—	—	—	—	—	—	—
		SB	5	9,290	—	—	—	—	—	—	—	—
	HOV	NB	1	1,850	2,060	1.11	—	—	2,240	1.21	—	—
		SB	1	1,850	1,920	1.04	—	—	1,810	0.98	—	—
Woodruff Avenue to Palo Verde Avenue/Stearns Street	GP	NB	4	8,250	—	—	—	—	—	—	—	—
		SB	4	7,120	8,720	1.18	—	F	8,020	1.21	—	F
	HOV	NB	1	1,850	2,050	1.10	—	—	2,050	1.11	—	—
		SB	1	1,850	2,160	1.17	—	—	2,020	1.09	—	—
Palo Verde Avenue/Stearns Street to Studebaker Road	GP	NB	5	9,250	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—
	HOV	NB	1	1,850	2,010	1.10	—	—	2,140	1.25	—	—
		SB	1	1,850	2,110	1.19	—	—	2,020	1.09	—	—
Studebaker Road to I-405 NB Off Ramp	GP	NB	5	7,400	8,850	1.20	—	—	10,150	1.37	—	—
		SB	5	9,250	8,740	0.94	30.7	D	9,150	0.99	58.9	E
	HOV	NB	1	1,850	2,300	1.24	—	—	2,710	1.45	—	—
		SB	1	1,850	2,310	1.19	—	—	2,610	1.09	—	—
I-405 NB Off Ramp to 7th St Off Ramp	GP	NB	2	7,400	7,510	0.99	39.0	E	8,700	1.18	—	F
		SB	4	7,400	7,460	1.01	34.4	D	8,160	1.10	—	F
	HOV	NB	1	1,850	2,800	1.24	—	—	2,710	1.45	—	—
		SB	1	1,850	2,310	1.19	—	—	2,360	1.28	—	—
7th St Off Ramp to I-405 SB On Ramp	GP	NB	4	7,400	7,840	0.99	39.0	E	8,700	1.18	—	—
		SB	4	7,400	7,890	1.00	33.7	D	8,040	1.09	—	F
	HOV	NB	1	1,850	2,800	1.24	—	—	2,710	1.45	—	—
		SB	1	1,850	2,310	1.19	—	—	2,360	1.28	—	—
I-405 Mainline												
Carson Street to Spring Street	GP	NB	4	7,400	5,510	0.75	14.1	C	6,480	0.92	31.3	D
		SB	4	7,400	8,020	1.08	40.4	E	7,400	1.03	38.0	E
	HOV	NB	1	1,850	1,570	0.85	—	—	2,040	1.10	—	—
		SB	1	1,850	2,020	1.09	—	—	1,800	0.87	—	—
Spring Street to Willow Street/Katella Ave	GP	NB	4	7,400	6,810	0.85	35.5	C	5,430	0.74	22.9	C
		SB	4	7,400	6,960	0.94	30.4	D	5,970	0.81	24.7	C
	HOV	NB	1	1,850	1,850	1.00	—	—	2,430	1.82	—	—
		SB	1	1,850	2,340	1.21	—	—	2,000	1.08	—	—
Willow Street/Katella Ave CD Road On Ramp to I-405	GP	NB	5	9,250	4,810	0.51	19.9	B	5,890	0.61	20.8	C
		SB	4	7,400	5,910	0.80	39.5	C	5,170	0.70	24.6	C
	HOV	NB	1	1,850	1,480	0.81	—	—	2,000	1.08	—	—
		SB	1	1,850	1,770	0.86	—	—	1,580	0.85	—	—
7th Street At-Grade												
Pepper Tree Lane to Studebaker Road	GP	EB	2	3,700	3,180	0.86	17.0	B	3,710	0.78	14.8	B
		WB	3	5,530	4,010	0.73	21.5	C	3,080	0.55	15.5	B
Studebaker Road to I-405	GP	EB	2	3,700	1,850	1.18	—	—	3,580	0.95	33.4	D
		WB	2	3,700	4,220	1.14	49.9	E	4,120	1.11	49.9	E

- Notes:
1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
 2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
 3. Level of Service (LOS): General Purpose (GP) lane based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS F.
 4. Peak hour capacities for freeway lanes include 1,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
 5. * Density is in excess of 45 pc/mi/ln, therefore LOS is F.

Long Beach Area Traffic Study

I-405 Improvement Project Supplemental Traffic Study

Interchange	Ramp Type	Ramp Lane Capacity	Alternative 2 (Year 2020) Conditions								
			AM Peak			PM Peak					
			Ramp	Ramp Junction	Ramp	Ramp Junction	Ramp	Ramp Junction			
			Traffic Volume ¹	D/C	Density ²	LOS ^{3,4}	Traffic Volume ¹	D/C	Density ²	LOS ^{3,4}	
I-405 Ramp Junctions											
Lakewood Blvd & Willow St	NB Off Direct	2	3,000	970	0.32	13.6	B	960	0.32	15.5	B
	NB On Loop	1	1,500	800	0.53	45.0	F	630	0.41	50.5	F
	NB On Direct	1	1,500	500	0.39	24.9	C	280	0.19	27.3	C
	SB Off (Direct + Loop)	2	3,000	1,110	0.37	17.5	B	1,380	0.46	20.1	F
	SB On Loop	1	1,500	300	0.20	42.5	F	370	0.25	42.9	F
	SB On Direct (from Willow St)	1	1,500	470	0.31	22.0	C	640	0.43	22.3	C
	NB Off Direct	1	1,500	530	0.35	27.0	C	570	0.38	32.0	D
	NB On (Direct + Loop)	2	3,000	1,220	0.41	14.0	F	810	0.27	13.1	F
	SB Off (Direct + Loop)	2	3,000	1,420	0.47	17.2	B	1,920	0.64	21.5	C
	SB On (Direct + Loop)	1	1,500	930	0.62	35.2	F	1,460	0.97	33.9	F
Woodruff Ave	NB Off Direct	1	1,500	650	0.43	23.9	C	350	0.23	26.4	C
	NB On Direct	1	1,500	440	0.29	34.9	F	310	0.21	41.4	F
	SB Off Direct	1	1,500	750	0.50	29.4	D	620	0.41	29.9	D
	SB On Direct	1	1,500	660	0.44	23.1	F	350	0.23	24.7	F
Palo Verde Ave & Stearns St	NB Off Direct	1	1,500	650	0.43	24.7	C	750	0.50	29.4	F
	NB On Loop	1	1,500	150	0.10	53.6	F	280	0.19	60.7	F
	SB On Direct (from Stearns St)	1	1,500	420	0.28	26.7	F	530	0.35	26.8	F
	NB On Direct	1	1,500	350	0.23	55.1	F	270	0.18	63.9	F
Studebaker Rd	SB Off Direct	1	1,500	420	0.28	35.4	E	300	0.20	35.8	E

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GL-9 (Continued)

GL-9 (Continued)

Improvement Project Supplemental Traffic Study Long Beach Area Traffic Study

Table 4.5-6: Alternative 2 (Year 2020) Ramp Junction Peak Hour Level of Service

Interchange	Ramp Type	Ramp Lanes	Ramp Capacity ^{1,4}	Alternative 2 (Year 2020) Conditions											
				AM Peak				PM Peak							
				Ramp	Ramp Junction	Ramp	Ramp Junction	Traffic Volume ¹	D/C	Density ²	LOS ^{3,5}	Traffic Volume ¹	D/C	Density ²	LOS ^{3,5}
1-605 Ramp Junctions															
Carson St	NB Off Direct	1	1,500	1,030	0.69	30.9	D	980	0.65	34.7	D				
	NB On Loop	1	1,500	490	0.33	19.2	B	540	0.36	22.2	C				
	NB On Direct	1	1,500	770	0.51	19.9	B	650	0.46	22.0	C				
	SB Off Direct	2	3,000	1,230	0.41	14.1	B	1,480	0.48	15.3	B				
	SB On Loop	1	1,500	560	0.37	22.5	C	450	0.30	21.4	C				
	SB On Direct	1	1,500	270	0.18	23.2	C	320	0.21	21.7	C				
Spring St/Certitos Ave	NB On Loop	1	1,500	720	0.48	17.9	B	1,040	0.69	19.4	B				
	SB Off Direct	1	1,500	1,050	0.70	35.6	E	1,430	0.95	35.6	E				
	NB Off (Direct + Loop)	1	1,500	1,050	0.71	0.2	A	1,630	1.09	5.1	A				
Willow St/Katella Ave	NB On Direct	1	1,500	1,050	0.71	19.1	B	1,400	0.93	20.8	C				
	SB Off Direct	1	1,500	550	0.37	35.0	E	580	0.39	31.0	D				
	SB Off Loop	1	1,500	1,120	0.75	35.8	E	1,020	0.68	30.9	D				
	SB On Direct (Direct + Loop)	1	1,500	620	0.41	24.5	C	800	0.53	21.7	C				
7th Street Ramp Junctions															
Studebaker Rd	EB Off Loop	1	1,500	200	0.13	34.3	D	730	0.49	30.3	D				
	EB On Loop	1	1,500	1,280	0.85	39.5	F	1,430	0.95	31.2	D				
	WB Off Loop	1	1,500	810	0.54	43.4	F	1,460	0.97	42.6	F				
	WB On Loop	1	1,500	630	0.42	30.3	D	510	0.34	22.4	C				

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1-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.5-6: Alternative 2 (Year 2020) Ramp Junction Peak Hour Level of Service

Interchange	Ramp Type	Ramp Lanes	Ramp Capacity ^{1,4}	Alternative 2 (Year 2020) Conditions							
				AM Peak				PM Peak			
				Ramp		Ramp Junction		Ramp		Ramp Junction	
				Traffic Volume ¹	D/C	Density ²	LOS ^{3,5}	Traffic Volume ¹	D/C	Density ²	LOS ^{3,5}
Freeway - to - Freeway Branch Connectors ⁷											
I-405/I-605 Freeway Interchanges	I-605 SB to I-405 NB	1	1,800	790	0.44	--	--	960	0.53	--	--
	I-605 SB/7th St to I-405 NB	2	3,600	1,500	0.42	--	--	1,440	0.40	--	--
	I-405 SB to I-605 NB	2	3,600	1,250	0.35	--	--	980	0.27	--	--
	I-605 SB to 7th St/I-405 SB	2	3,600	5,120	1.42	--	--	4,710	1.17	--	--
	I-605 SB/I-405 SB to 7th St	1	1,800	2,050	1.14	--	--	1,500	0.58	--	--
	7th St to I-405 NB/I-405 NB	2	3,600	1,060	0.29	--	--	1,230	0.34	--	--
	7th St to I-405 NB	1	1,800	720	0.40	--	--	420	0.29	--	--

- Notes:
1. Peak hour capacity and traffic demand forecast volumes are shown in vehicles per hour (vph).
 2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
 3. Level of Service (LOS) is based on density (pc/mi/ln); D/C - demand to capacity ratio.
 4. Peak hour capacities for freeway ramps include 1,500 vph for each freeway ramp lane and 1,800 vph for each freeway-to-freeway branch connector lane.
 5. LOS F is the total flow of the merge/diverge area exceeds the capacity of the freeway segment the density is not applicable in this case.
 6. * Per Highway Capacity Manual, as the impact area of merge and diverge is primarily focused on an influence area of 1,500 ft, the density was not calculated for areas exceeding 1,500 ft in length.
 7. For freeway-to-freeway branch connectors, D/C ratios are provided.

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.5-7: Alternative 2 (Year 2020) Weaving Level-of-Service
Freeway and Collector-Distributor Roads

Weaving Segment	AM Peak Hour		PM Peak Hour	
	Density ¹	LOS ²	Density ¹	LOS ²
Freeway Mainline				
I-405 Southbound - Lakewood Boulevard/Willow Street to Bellflower Boulevard	45.4	F	70.9	F
I-405 Northbound - Bellflower Boulevard to Lakewood Boulevard/Willow Street	47.7	F	41.3	E
I-405 Southbound - Bellflower Boulevard to Woodruff Avenue	41.2	E	68.0	F
I-405 Northbound - Woodruff Avenue to Bellflower Boulevard	52.4	F	47.8	F
I-405 Northbound - Palo Verde Avenue/Stearns Street to Woodruff Avenue	46.9	F	40.8	E
I-405 Southbound - Palo Verde Avenue/Stearns Street to Studebaker Road	33.1	D	43.9	F
I-405 Northbound - Studebaker Road to Palo Verde Avenue/Stearns Street	45.1	F	45.4	F
Collector-Distributor (C-D) Roads				
Lakewood Boulevard/Willow Street Interchange at I-405				
Southbound C-D Road	16.2	B	22.5	C
Bellflower Boulevard/Los Coyotes Diagonal Interchange at I-405				
Southbound C-D Road	5.0	A	3.8	A

Notes:

1. Density is shown in passenger cars/mile/lane (pc/mi/ln).
2. Level of Service (LOS) is based on density (pc/mi/ln). The density LOS thresholds are different for the freeway mainline and collector-distributor roads.

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.5-8: Alternative 2 (Year 2040) Mainline Peak Hour Level of Service

Location	Lane Type	Direction	Mainline		Alternative 2 (Year 2040) Conditions							
			Lanes	Capacity ¹	Traffic Demand Volume ²	AM Peak Hour			PM Peak Hour			
						D/C	Density ³	LOS ³	Traffic Demand Volume ²	D/C	Density ³	LOS ³
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Willow Street	GP	NB	3	9,250	10,570	1.12	— ⁴	F	13,870	1.18	— ⁴	F
		SB	3	9,250	10,440	1.13	43.2	E	10,940	1.17	— ⁴	F
	HOV	NB	1	1,850	2,200	1.19	—	—	2,460	1.88	—	—
		SB	1	1,850	2,070	1.12	—	—	1,860	1.66	—	—
Lakewood Boulevard/Willow Street to Bellflower Boulevard	GP	NB	3	9,250	—	—	—	—	—	—	—	—
		SB	3	9,250	—	—	—	—	—	—	—	—
	HOV	NB	1	1,850	2,140	1.16	—	—	2,430	1.81	—	—
		SB	1	1,850	2,070	1.12	—	—	1,860	1.66	—	—
Bellflower Boulevard to Woodruff Avenue	GP	NB	3	9,250	—	—	—	—	—	—	—	—
		SB	3	9,250	—	—	—	—	—	—	—	—
	HOV	NB	1	1,850	2,220	1.20	—	—	2,420	1.81	—	—
		SB	1	1,850	2,070	1.12	—	—	1,860	1.66	—	—
Woodruff Avenue to Palo Verde Avenue/Stearns Street	GP	NB	3	9,250	—	—	—	—	—	—	—	—
		SB	3	9,250	—	—	—	—	—	—	—	—
	HOV	NB	1	1,850	2,440	1.28	— ⁴	F	2,640	1.91	— ⁴	F
		SB	1	1,850	2,180	1.18	—	—	2,220	1.50	—	—
Palo Verde Avenue/Stearns Street to Studebaker Road	GP	NB	3	9,250	—	—	—	—	—	—	—	—
		SB	3	9,250	—	—	—	—	—	—	—	—
	HOV	NB	1	1,850	2,190	1.18	—	—	2,540	1.87	—	—
		SB	1	1,850	2,090	1.20	—	—	2,180	1.59	—	—
Studebaker Road to I-405 NB Off Ramp	GP	NB	4	7,400	9,560	1.20	— ⁴	F	10,950	1.48	— ⁴	F
		SB	3	9,250	9,450	1.23	85.1	E	9,890	1.07	64.7	C
	HOV	NB	1	1,950	2,490	1.35	—	—	2,930	1.58	—	—
		SB	1	1,850	2,380	1.29	—	—	2,130	1.17	—	—
I-405 NB Off Ramp to 7th St Off Ramp	GP	NB	1	7,400	7,040	1.37	45.0	E	9,400	1.77	— ⁴	F
		SB	1	7,400	7,090	1.29	40.5	E	8,890	1.15	— ⁴	F
	HOV	NB	1	1,870	2,490	1.35	—	—	2,930	1.58	—	—
		SB	1	1,850	2,380	1.29	—	—	2,660	1.88	—	—
7th St Off Ramp to I-405 SB On Ramp	GP	NB	4	7,400	7,840	1.27	45.0	E	9,400	1.77	— ⁴	F
		SB	4	7,400	7,960	1.28	50.4	E	8,990	1.17	— ⁴	F
	HOV	NB	1	1,850	3,480	1.85	—	—	3,840	1.88	—	—
		SB	1	1,850	3,380	1.29	—	—	3,560	1.38	—	—
I-405 Mainline												
Cannon Street to Spring Street	GP	NB	4	7,400	8,940	0.81	26.2	D	7,020	0.85	84.7	C
		SB	4	7,400	8,650	1.17	— ⁴	F	8,300	1.08	42.2	E
	HOV	NB	1	1,850	1,700	0.92	—	—	2,250	1.19	—	—
		SB	1	1,850	2,180	1.18	—	—	1,950	1.65	—	—
Spring Street to Willow Street/Katella Ave	GP	NB	4	7,400	9,220	0.70	21.2	C	8,800	0.80	34.4	C
		SB	4	7,400	7,520	1.22	34.2	D	6,450	0.87	27.2	D
	HOV	NB	1	1,850	2,000	1.08	—	—	2,890	1.43	—	—
		SB	1	1,850	2,420	1.51	—	—	2,160	1.17	—	—
Willow Street/Katella Ave CD Road On Ramp to I-405	GP	NB	3	9,250	3,320	0.56	17.2	B	6,140	0.66	22.3	C
		SB	4	7,400	6,190	0.86	28.3	D	5,580	0.75	26.6	D
	HOV	NB	1	1,850	1,810	0.87	—	—	2,240	1.17	—	—
		SB	1	1,850	1,910	0.58	—	—	1,710	0.62	—	—
7th Street Mainline												
Pepper Tree Lane to Studebaker Road	GP	EB	2	3,700	5,180	0.66	17.0	B	2,770	0.75	44.6	B
		WB	2	3,550	4,020	0.72	21.5	C	3,080	0.85	16.5	B
Studebaker Road to I-405	GP	EB	3	3,700	4,150	1.18	— ⁴	F	5,530	0.55	30.4	D
		WB	2	3,700	4,200	1.14	42.9	E	6,120	1.11	40.9	E

Notes:

1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS): General Purpose (GP) lane LOS is based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS F.
4. Peak hour capacity for freeway lanes include 1,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
5. * Density is in excess of 45 pc/mi/ln; therefore, LOS is F.

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GL-9 (Continued)

GL-9 (Continued)

Long Beach Area Traffic Study

Table 4.5-9: Alternative 2 (Year 2040) Ramp Junction Peak Hour Level of Service

Interchange	Ramp Type	Ramp Lines Capacity	Alternative 2 (Year 2040) Conditions									
			AM Peak					PM Peak				
			Ramp Traffic Volume ¹	D/C	Ramp Junction Density ²	LOS ^{3,4}	Traffic Volume ¹	D/C	Ramp Junction Density ²	LOS ^{3,4}		
I-405 Ramp Junctions												
Lakewood Blvd & Willow St	NB Off Direct	2	3,000	1,040	0.35	15.7	B	1,040	0.35	17.8	F	
	NB On Loop	1	1,500	870	0.58	48.2	F	650	0.44	54.3	F	
	NB On Direct	1	1,500	640	0.43	26.7	F	300	0.20	29.6	F	
	SB Off (Direct + Loop)	2	3,000	1,210	0.40	19.7	B	1,450	0.50	27.6	F	
	SB On Loop	1	1,500	330	0.22	45.8	F	400	0.27	46.2	F	
Bellflower Blvd & Los Coyotes Diagonal	SB On Direct (from Willow St)	1	1,500	510	0.34	23.5	C	690	0.46	23.7	F	
	NB Off Direct	1	1,500	570	0.38	29.5	D	620	0.41	35.0	F	
	NB On (Direct + Loop)	2	3,000	1,320	0.44	16.0	F	870	0.29	15.0	F	
	SB Off (Direct + Loop)	2	3,000	1,530	0.51	19.5	B	2,080	0.69	24.2	F	
	SB On (Direct + Loop)	1	1,500	1,010	0.67	37.3	F	1,180	1.05	35.4	F	
Woodruff Ave	NB Off Direct	1	1,500	710	0.47	26.6	C	380	0.25	29.4	F	
	NB On Direct	1	1,500	470	0.31	37.4	F	340	0.23	44.5	F	
	SB Off Direct	1	1,500	820	0.55	32.2	D	670	0.45	32.7	F	
	SB On Direct	1	1,500	710	0.47	24.1	F	370	0.25	26.1	F	
	NB Off Direct	1	1,500	710	0.47	27.5	F	810	0.54	32.6	F	
Palo Verde Ave & Stearn St	NB On Loop	1	1,500	160	0.11	58.3	F	300	0.20	65.8	F	
	SB On Direct (from Stearn St)	1	1,500	460	0.31	28.1	F	580	0.39	28.1	F	
	NB On Direct	1	1,500	380	0.25	59.7	F	300	0.20	69.2	F	
	SB Off Direct	1	1,500	450	0.30	38.1	E	330	0.22	38.6	F	
	SB On Direct	1	1,500	100	0.07	37.4	E	130	0.09	40.7	F	
7th St												

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I-405 Improvement Project Supplemental Traffic Study

Table 4.5-9: Alternative 2 (Year 2040) Ramp Junction Peak Hour Level of Service

Interchange	Ramp Type	Ramp Lanes Capacity	Alternative 2 (Year 2040) Conditions								
			AM Peak				PM Peak				
			Ramp Traffic Volume ¹	D/C	Density ² LOS ^{3,4}	Ramp Junction	Ramp Traffic Volume ¹	D/C	Density ² LOS ^{3,4}	Ramp Junction	
I-605 Ramp Junctions											
Carson St	NB Off Direct	1	1,500	1,110	0.74	33.3	D	1,060	0.71	37.4	E
	NB On Loop	1	1,500	530	0.35	20.4	C	590	0.39	23.6	C
	NB On Direct	1	1,500	630	0.55	20.8	C	740	0.49	23.1	C
	SB Off Direct	2	3,000	1,330	0.44	16.2	B	1,900	0.53	17.5	B
	SB On Loop	1	1,500	600	0.40	23.5	F	490	0.33	22.5	C
	SB On Direct	1	1,500	300	0.20	24.5	F	350	0.23	22.9	C
	NB On Loop	1	1,500	780	0.52	18.6	B	1,120	0.75	20.0	B
	SB Off Direct	1	1,500	1,130	0.75	38.2	E	1,550	1.03	38.3	E
Spring St/Curritos Ave	NB Off (Direct + Loop)	1	1,500	1,140	0.76	0.6	A	1,760	1.17	7.5	A
	NB On Direct	1	1,500	1,150	0.77	20.0	C	1,520	1.01	21.8	C
	SB Off Direct	1	1,500	600	0.40	37.7	E	630	0.42	33.3	D
	SB Off Loop	1	1,500	1,210	0.81	38.5	E	1,110	0.74	33.2	D
Willow St/Marela Ave	SB On Direct (Direct + Loop)	1	1,500	670	0.45	26.2	C	870	0.58	23.1	C
	7th Street Ramp Junctions										
Studebaker Rd	EB Off Loop	1	1,500	210	0.14	34.3	D	790	0.53	30.3	D
	EB On Loop	1	1,500	1,380	0.92	40.3	F	1,540	1.03	33.1	D
	WB Off Loop	1	1,500	870	0.58	43.4	F	1,180	1.05	42.6	F
	WB On Loop	1	1,500	690	0.46	30.8	D	550	0.37	22.7	C

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GL-9 (Continued)

GL-9 (Continued)

Long Beach Area Traffic Study

Improvement Project Supplemental Traffic Study

Table 4.5-9: Alternative 2 (Year 2040) Ramp Junction Peak Hour Level of Service										
Interchange	Ramp Type	Ramp Lanes	Ramp Capacity ^{1,4}	Alternative 2 (Year 2040) Conditions				PM Peak		
				AM Peak		Ramp Junction	Ramp		Density ²	LOS ^{3,5}
				Traffic Volume ⁵	D/C		Density ²	Traffic Volume ¹		
Freeway-to-Freeway Branch Connectors ⁷										
I-405/I-505 Freeway Interchanges	I-405 SB to I-405 NB	1	3,800	850	0.47	--	--	1,040	0.58	--
	I-605 SB/701 St to I-405 NB	2	3,600	1,350	0.45	--	--	1,550	0.43	--
	I-405 SB to I-605 NB	2	3,600	1,350	0.38	--	--	1,050	0.29	--
	I-605 SB to 7th St/I-405 SB	2	3,600	5,540	1.54	--	--	4,550	1.26	--
	I-605 SB/I-405 SB to 701 St	1	3,800	2,050	1.14	--	--	1,040	0.58	--
	7th St to I-605 NB/I-405 NB	2	3,600	510	0.14	--	--	380	0.11	--
	7th St to I-405 NB	1	3,800	780	0.43	--	--	460	0.26	--

- Notes:
1. Peak hour capacity and traffic demand forecast volumes are shown in vehicles per hour (vph).
 2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
 3. Level of Service (LOS) is based on density (pc/mi/ln). D/C - demand-to-capacity ratio.
 4. Peak hour capacities for freeway ramp include 1,500 vph for each freeway ramp lane and 1,800 vph for each freeway-to-freeway branch connector lane.
 5. LOS F as the total flow of the merged/diverge area exceeds the capacity of the freeway segment, the density is not applicable in this case.
 6. * Per Highway Capacity Manual, as the impact area of merge and diverge is primarily focused on an influence area of 1,500 ft, the density was not calculated for areas exceeding 1,500 ft in length.
 7. For freeway-to-freeway branch connectors, D/C ratios are provided.

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I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.5-10: Alternative 2 (Year 2040) Weaving Level-of-Service
Freeway and Collector-Distributor Roads

Weaving Segment	AM Peak Hour		PM Peak Hour	
	Density ¹	LOS ²	Density ¹	LOS ²
Freeway Mainline				
I-405 Southbound - Lakewood Boulevard/Willow Street to Bellflower Boulevard	50.3	F	78.3	F
I-405 Northbound - Bellflower Boulevard to Lakewood Boulevard/Willow Street	37.2	E	45.2	F
I-405 Southbound - Bellflower Boulevard to Woodruff Avenue	45.8	F	74.9	F
I-405 Northbound - Woodruff Avenue to Bellflower Boulevard	57.9	F	51.5	F
I-405 Northbound - Palo Verde Avenue/Stearns Street to Woodruff Avenue	51.7	F	45.1	F
I-405 Southbound - Palo Verde Avenue/Stearns Street to Studebaker Road	36.2	E	48.0	F
I-405 Northbound - Studebaker Road to Palo Verde Avenue/Stearns Street	49.7	F	50.3	F
Collector-Distributor (C-D) Roads				
Lakewood Boulevard/Willow Street Interchange at I-405				
Southbound C-D Road	16.2	B	22.5	C
Bellflower Boulevard/Los Coyotes Diagonal Interchange at I-405				
Southbound C-D Road	5.0	A	3.8	A

Notes:

1. Density is shown in passenger cars/mile/lane (pc/mi/ln).
2. Level of Service (LOS) is based on density (pc/mi/ln). The density LOS thresholds are different for the freeway mainline and collector-distributor roads.

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GL-9 (Continued)

Living Beach, near Pacific Beach

[illegible]

Google Custom Search

GL-9 (Continued)

Table 3.5-1: New 2040 Alternatives 1 only, Year 2040 New Build Alternative 1 - Conceptual																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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135	Alt 136	Alt 137	Alt 138	Alt 139	Alt 140	Alt 141	Alt 142	Alt 143	Alt 144	Alt 145	Alt 146	Alt 147	Alt 148	Alt 149	Alt 150	Alt 151	Alt 152	Alt 153	Alt 154	Alt 155	Alt 156	Alt 157	Alt 158	Alt 159	Alt 160	Alt 161	Alt 162	Alt 163	Alt 164	Alt 165	Alt 166	Alt 167	Alt 168	Alt 169	Alt 170	Alt 171	Alt 172	Alt 173	Alt 174	Alt 175	Alt 176	Alt 177	Alt 178	Alt 179	Alt 180	Alt 181	Alt 182	Alt 183	Alt 184	Alt 185	Alt 186	Alt 187	Alt 188	Alt 189	Alt 190	Alt 191	Alt 192	Alt 193	Alt 194	Alt 195	Alt 196	Alt 197	Alt 198	Alt 199	Alt 200	Alt 201	Alt 202	Alt 203	Alt 204	Alt 205	Alt 206	Alt 207	Alt 208	Alt 209	Alt 210	Alt 211	Alt 212	Alt 213	Alt 214	Alt 215	Alt 216	Alt 217	Alt 218	Alt 219	Alt 220	Alt 221	Alt 222	Alt 223	Alt 224	Alt 225	Alt 226	Alt 227	Alt 228	Alt 229	Alt 230	Alt 231	Alt 232	Alt 233	Alt 234	Alt 235	Alt 236	Alt 237	Alt 238	Alt 239	Alt 240	Alt 241	Alt 242	Alt 243	Alt 244	Alt 245	Alt 246	Alt 247	Alt 248	Alt 249	Alt 250	Alt 251	Alt 252	Alt 253	Alt 254	Alt 255	Alt 256	Alt 257	Alt 258	Alt 259	Alt 260	Alt 261	Alt 262	Alt 263	Alt 264	Alt 265	Alt 266	Alt 267	Alt 268	Alt 269	Alt 270	Alt 271	Alt 272	Alt 273	Alt 274	Alt 275	Alt 276	Alt 277	Alt 278	Alt 279	Alt 280	Alt 281	Alt 282	Alt 283	Alt 284	Alt 285	Alt 286	Alt 287	Alt 288	Alt 289	Alt 290	Alt 291	Alt 292	Alt 293	Alt 294	Alt 295	Alt 296	Alt 297	Alt 298	Alt 299	Alt 300	Alt 301	Alt 302	Alt 303	Alt 304	Alt 305	Alt 306	Alt 307	Alt 308	Alt 309	Alt 310	Alt 311	Alt 312	Alt 313	Alt 314	Alt 315	Alt 316	Alt 317	Alt 318	Alt 319	Alt 320	Alt 321	Alt 322	Alt 323	Alt 324	Alt 325	Alt 326	Alt 327	Alt 328	Alt 329	Alt 330	Alt 331	Alt 332	Alt 333	Alt 334	Alt 335	Alt 336	Alt 337	Alt 338	Alt 339	Alt 340	Alt 341	Alt 342	Alt 343	Alt 344	Alt 345	Alt 346	Alt 347	Alt 348	Alt 349	Alt 350	Alt 351	Alt 352	Alt 353	Alt 354	Alt 355	Alt 356	Alt 357	Alt 358	Alt 359	Alt 360	Alt 361	Alt 362	Alt 363	Alt 364	Alt 365	Alt 366	Alt 367	Alt 368	Alt 369	Alt 370	Alt 371	Alt 372	Alt 373	Alt 374	Alt 375	Alt 376	Alt 377	Alt 378	Alt 379	Alt 380	Alt 381	Alt 382	Alt 383	Alt 384	Alt 385	Alt 386	Alt 387	Alt 388	Alt 389	Alt 390	Alt 391	Alt 392	Alt 393	Alt 394	Alt 395	Alt 396	Alt 397	Alt 398	Alt 399	Alt 400	Alt 401	Alt 402	Alt 403	Alt 404	Alt 405	Alt 406	Alt 407	Alt 408	Alt 409	Alt 410	Alt 411	Alt 412	Alt 413	Alt 414	Alt 415	Alt 416	Alt 417	Alt 418	Alt 419	Alt 420	Alt 421	Alt 422	Alt 423	Alt 424	Alt 425	Alt 426	Alt 427	Alt 428	Alt 429	Alt 430	Alt 431	Alt 432	Alt 433	Alt 434	Alt 435	Alt 436	Alt 437	Alt 438	Alt 439	Alt 440	Alt 441	Alt 442	Alt 443	Alt 444	Alt 445	Alt 446	Alt 447	Alt 448	Alt 449	Alt 450	Alt 451	Alt 452	Alt 453	Alt 454	Alt 455	Alt 456	Alt 457	Alt 458	Alt 459	Alt 460	Alt 461	Alt 462	Alt 463	Alt 464	Alt 465	Alt 466	Alt 467	Alt 468	Alt 469	Alt 470	Alt 471	Alt 472	Alt 473	Alt 474	Alt 475	Alt 476	Alt 477	Alt 478	Alt 479	Alt 480	Alt 481	Alt 482	Alt 483	Alt 484	Alt 485	Alt 486	Alt 487	Alt 488	Alt 489	Alt 490	Alt 491	Alt 492	Alt 493	Alt 494	Alt 495	Alt 496	Alt 497	Alt 498	Alt 499	Alt 500	Alt 501	Alt 502	Alt 503	Alt 504	Alt 505	Alt 506	Alt 507	Alt 508	Alt 509	Alt 510	Alt 511	Alt 512	Alt 513	Alt 514	Alt 515	Alt 516	Alt 517	Alt 518	Alt 519	Alt 520	Alt 521	Alt 522	Alt 523	Alt 524	Alt 525	Alt 526	Alt 527	Alt 528	Alt 529	Alt 530	Alt 531	Alt 532	Alt 533	Alt 534	Alt 535	Alt 536	Alt 537	Alt 538	Alt 539	Alt 540	Alt 541	Alt 542	Alt 543	Alt 544	Alt 545	Alt 546	Alt 547	Alt 548	Alt 549	Alt 550	Alt 551	Alt 552	Alt 553	Alt 554	Alt 555	Alt 556	Alt 557	Alt 558	Alt 559	Alt 560	Alt 561	Alt 562	Alt 563	Alt 564	Alt 565	Alt 566	Alt 567	Alt 568	Alt 569	Alt 570	Alt 571	Alt 572	Alt 573	Alt 574	Alt 575	Alt 576	Alt 577	Alt 578	Alt 579	Alt 580	Alt 581	Alt 582	Alt 583	Alt 584	Alt 585	Alt 586	Alt 587	Alt 588	Alt 589	Alt 590	Alt 591	Alt 592	Alt 593	Alt 594	Alt 595	Alt 596	Alt 597	Alt 598	Alt 599	Alt 600	Alt 601	Alt 602	Alt 603	Alt 604	Alt 605	Alt 606	Alt 607	Alt 608	Alt 609	Alt 610	Alt 611	Alt 612	Alt 613	Alt 614	Alt 615	Alt 616	Alt 617	Alt 618	Alt 619	Alt 620	Alt 621	Alt 622	Alt 623	Alt 624	Alt 625	Alt 626	Alt 627	Alt 628	Alt 629	Alt 630	Alt 631	Alt 632	Alt 633	Alt 634	Alt 635	Alt 636	Alt 637	Alt 638	Alt 639	Alt 640	Alt 641	Alt 642	Alt 643	Alt 644	Alt 645	Alt 646	Alt 647	Alt 648	Alt 649	Alt 650	Alt 651	Alt 652	Alt 653	Alt 654	Alt 655	Alt 656	Alt 657	Alt 658	Alt 659	Alt 660	Alt 661	Alt 662	Alt 663	Alt 664	Alt 665	Alt 666	Alt 667	Alt 668	Alt 669	Alt 670	Alt 671	Alt 672	Alt 673	Alt 674	Alt 675	Alt 676	Alt 677	Alt 678	Alt 679	Alt 680	Alt 681	Alt 682	Alt 683	Alt 684	Alt 685	Alt 686	Alt 687	Alt 688	Alt 689	Alt 690	Alt 691	Alt 692	Alt 693	Alt 694	Alt 695	Alt 696	Alt 697	Alt 698	Alt 699	Alt 700	Alt 701	Alt 702	Alt 703	Alt 704	Alt 705	Alt 706	Alt 707	Alt 708	Alt 709	Alt 710	Alt 711	Alt 712	Alt 713	Alt 714	Alt 715	Alt 716	Alt 717	Alt 718	Alt 719	Alt 720	Alt 721	Alt 722	Alt 723	Alt 724	Alt 725	Alt 726	Alt 727	Alt 728	Alt 729	Alt 730	Alt 731	Alt 732	Alt 733	Alt 734	Alt 735	Alt 736	Alt 737	Alt 738	Alt 739	Alt 740	Alt 741	Alt 742	Alt 743	Alt 744	Alt 745	Alt 746	Alt 747	Alt 748	Alt 749	Alt 750	Alt 751	Alt 752	Alt 753	Alt 754	Alt 755	Alt 756	Alt 757	Alt 758	Alt 759	Alt 760	Alt 761	Alt 762	Alt 763	Alt 764	Alt 765	Alt 766	Alt 767	Alt 768	Alt 769	Alt 770	Alt 771	Alt 772	Alt 773	Alt 774	Alt 775	Alt 776	Alt 777	Alt 778	Alt 779	Alt 780	Alt 781	Alt 782	Alt 783	Alt 784	Alt 785	Alt 786	Alt 787	Alt 788	Alt 789	Alt 790	Alt 791	Alt 792	Alt 793	Alt 794	Alt 795	Alt 796	Alt 797	Alt 798	Alt 799	Alt 800	Alt 801	Alt 802	Alt 803	Alt 804	Alt 805	Alt 806	Alt 807	Alt 808	Alt 809	Alt 810	Alt 811	Alt 812	Alt 813	Alt 814	Alt 815	Alt 816	Alt 817	Alt 818	Alt 819	Alt 820	Alt 821	Alt 822	Alt 823	Alt 824	Alt 825	Alt 826	Alt 827	Alt 828	Alt 829	Alt 830	Alt 831	Alt 832	Alt 833	Alt 834	Alt 835	Alt 836	Alt 837	Alt 838	Alt 839	Alt 840	Alt 841	Alt 842	Alt 843	Alt 844	Alt 845	Alt 846	Alt 847	Alt 848	Alt 849	Alt 850	Alt 851	Alt 852	Alt 853	Alt 854	Alt 855	Alt 856	Alt 857	Alt 858	Alt 859	Alt 860	Alt 861	Alt 862	Alt 863	Alt 864	Alt 865	Alt 866	Alt 867	Alt 868	Alt 869	Alt 870	Alt 871	Alt 872	Alt 873	Alt 874	Alt 875	Alt 876	Alt 877	Alt 878	Alt 879	Alt 880	Alt 881	Alt 882	Alt 883	Alt 884	Alt 885	Alt 886	Alt 887	Alt 888	Alt 889	Alt 890	Alt 891	Alt 892	Alt 893	Alt 894	Alt 895	Alt 896	Alt 897	Alt 898	Alt 899	Alt 900	Alt 901	Alt 902	Alt 903	Alt 904	Alt 905	Alt 906	Alt 907	Alt 908	Alt 909	Alt 910	Alt 911	Alt 912	Alt 913	Alt 914	Alt 915	Alt 916	Alt 917	Alt 918	Alt 919	Alt 920	Alt 921	Alt 922	Alt 923	Alt 924	Alt 925	Alt 926	Alt 927	Alt 928	Alt 929	Alt 930	Alt 931	Alt 932	Alt 933	Alt 934	Alt 935	Alt 936	Alt 937	Alt 938	Alt 939	Alt 940	Alt 941	Alt 942	Alt 943	Alt 944	Alt 945	Alt 946	Alt 947	Alt 948	Alt 949	Alt 950	Alt 951	Alt 952	Alt 953	Alt 954	Alt 955	Alt 956	Alt 957	Alt 958	Alt 959	Alt 960	Alt 961	Alt 962	Alt 963	Alt 964	Alt 965	Alt 966	Alt 967	Alt 968	Alt 969	Alt 970	Alt 971	Alt 972	Alt 973	Alt 974	Alt 975	Alt 976	Alt 977	Alt 978	Alt 979	Alt 980	Alt 981	Alt 982	Alt 983	Alt 984	Alt 985	Alt 986	Alt 987	Alt 988	Alt 989	Alt 990	Alt 991	Alt 992	Alt 993	Alt 994	Alt 995	Alt 996	Alt 997	Alt 998	Alt 999	Alt 1000	Alt 1001	Alt 1002	Alt 1003	Alt 1004	Alt 1005	Alt 1006	Alt 1007	Alt 1008	Alt 1009	Alt 1010	Alt 1011	Alt 1012	Alt 1013	Alt 1014	Alt 1015	Alt 1016	Alt 1017	Alt 1018	Alt 1019	Alt 1020	Alt 1021	Alt 1022	Alt 1023	Alt 1024	Alt 1025	Alt 1026	Alt 1027	Alt 1028	Alt 1029	Alt 1030	Alt 1031	Alt 1032	Alt 1033	Alt 1034	Alt 1035	Alt 1036	Alt 1037	Alt 1038	Alt 1039	Alt 1040	Alt 1041	Alt 1042	Alt 1043	Alt 1044	Alt 1045	Alt 1046	Alt 1047	Alt 1048	Alt 1049	Alt 1050	Alt 1051	Alt 1052	Alt 1053	Alt 1054	Alt 1055	Alt 1056	Alt 1057	Alt 1058	Alt 1059	Alt 1060	Alt 1061	Alt 1062	Alt 1063	Alt 1064	Alt 1065	Alt 1066	Alt 1067	Alt 1068	Alt 1069	Alt 1070	Alt 1071	Alt 1072	Alt 1073	Alt 1074	Alt 1075	Alt 1076	Alt 1077	Alt 1078	Alt 1079	Alt 1080	Alt 1081	Alt 1082	Alt 1083	Alt 1084	Alt 1085	Alt 1086	Alt 1087	Alt 1088	Alt 1089	Alt 1090	Alt 1091	Alt 1092	Alt 1093	Alt 1094	Alt 1095	Alt 1096	Alt 1097	Alt 1098	Alt 1099	Alt 1100	Alt 1101	Alt 1102	Alt 1103	Alt 1104	Alt 1105	Alt 1106	Alt 1107	Alt 1108	Alt 1109	Alt 1110	Alt 1111	Alt 1112	Alt 1113	Alt 1114	Alt 1115	Alt 1116	Alt 1117	Alt 1118	Alt 1119	Alt 1120	Alt 1121	Alt 1122	Alt 1123	Alt 1124	Alt 1125	Alt 1126	Alt 1127	Alt 1128	Alt 1129	Alt 1130	Alt 1131	Alt 1132	Alt 1133	Alt 1134	Alt 1135	Alt 1136	Alt 1137	Alt 1138	Alt 1139	Alt 1140	Alt 1141	Alt 1142	Alt 1143	Alt 1144	Alt 1145	Alt 1146	Alt 1147	Alt 1148	Alt 1149	Alt 1150	Alt 1151	Alt 1152	Alt 1153	Alt 1154	Alt 1155	Alt 1156	Alt 1157	Alt 1158	Alt 1159	Alt 1160	Alt 1161	Alt 1162	Alt 1163	Alt 1164	Alt 1165	Alt 1166	Alt 1167	Alt 1168	Alt 1169	Alt 1170	Alt 1171	Alt 1172	Alt 1173	Alt 1174	Alt 1175	Alt 1176	Alt 1177	Alt 1178	Alt 1179	Alt 1180	Alt 1181	Alt 1182	Alt 1183	Alt 1184	Alt 1185	Alt 1186	Alt 1187	Alt 1188	Alt 1189</

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Lung Beach Area Traffic Study

No.	Location		Traffic Control/Comments	Alternative 3 (Year 2020) LOS					
	East/West Street	North/South Street		AM Peak Hour			PM Peak Hour		
				D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS
1	Carson St	I-605 SB Off Ramp	Existing Traffic Signal	0.64	13.1	B	0.74	13.0	B
2	Carson St	I-605 SB Direct On Ramp	Unsignalized On Ramp	0.24	--	--	0.32	--	--
		I-605 SB Loop On Ramp	Unsignalized On Ramp	0.33	--	--	0.37	--	--
3	Carson St	I-605 NB Off Ramp	Existing Traffic Signal	0.61	20.9	C	0.75	17.6	B
		I-605 NB Loop On Ramp	Unsignalized On Ramp	0.28	--	--	0.30	--	--
4	Carson St	I-605 NB Direct On Ramp	Unsignalized On Ramp	0.51	--	--	0.46	--	--
5	Spring St/Cerritos Ave	Pioneer Blvd	Existing Traffic Signal	0.76	31.7	C	0.83	31.8	C
6	Spring St/Cerritos Ave	I-605 SB Off Ramp	Existing Traffic Signal	0.70	34.4	B	0.60	9.8	A
7	I-405 NB Direct Off Ramp	I-405 NB On Ramp	Existing Traffic Signal	0.74	6.1	A	0.75	4.9	A
		I-405 NB Direct Off Ramp	Unsignalized Off Ramp	0.44	--	--	0.43	--	--
8	I-405 NB Loop Off Ramp	I-405 NB Loop On Ramp	Unsignalized On Ramp	0.38	--	--	0.23	--	--
		I-405 NB Loop Off Ramp	Unsignalized Off Ramp	0.28	--	--	0.26	--	--
9	I-405 SB Direct Off Ramp	Lakewood Blvd	Unsignalized On Ramp	0.52	--	--	0.41	--	--
10	Willow St	I-405 SB Direct Off Ramp	Unsignalized Off Ramp	0.23	--	--	0.27	--	--
		I-405 SB Direct Off Ramp	Unsignalized Off Ramp	0.44	--	--	0.46	--	--
11	Willow St	I-405 SB Loop Off Ramp	Existing Traffic Signal	0.72	31.1	C	0.96	44.3	D
		I-405 SB Loop Off Ramp	Unsignalized Off Ramp	0.36	--	--	0.45	--	--
12	I-405 NB Direct Off Ramp	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.30	--	--	0.43	--	--
13	Willow St	I-405 NB Off Ramp	Existing Traffic Signal	0.41	9.3	A	0.53	11.1	B
		I-405 NB Loop On Ramp	Unsignalized On Ramp	0.54	--	--	0.36	--	--
14	I-405 NB Direct On Ramp	Bellflower Blvd	Unsignalized On Ramp	0.32	--	--	0.18	--	--
15	Los Coyotes Diagonal	Bellflower Blvd	Existing Traffic Signal	0.86	32.9	C	1.15	76.5	E
16	I-405 SB Loop Off Ramp	Bellflower Blvd	Existing Traffic Signal	0.64	25.8	C	1.12	50.2	D
17	I-405 SB Direct On Ramp	Bellflower Blvd	Unsignalized On Ramp	0.09	--	--	0.12	--	--
18	Los Coyotes Diagonal	I-405 SB Direct On Ramp	Existing Traffic Signal	0.12	--	--	0.37	--	--
19	Willow St	I-405 SB Loop On Ramp	Existing Traffic Signal	0.53	10.2	B	0.52	9.8	A
20	Willow St	Los Coyotes Diagonal	Unsignalized On Ramp	0.32	--	--	0.17	--	--
21	Willow St	Woodruff Ave	Existing Traffic Signal	0.75	40.9	D	1.16	66.5	E
22	I-405 NB Direct Off Ramp	Woodruff Ave	Existing Traffic Signal	1.30	137.0	F	0.87	37.3	D
23	I-405 NB Direct On Ramp	I-405 NB Direct Off Ramp	Unsignalized Off Ramp	0.40	--	--	0.22	--	--
		I-405 NB Direct On Ramp	Unsignalized On Ramp	0.31	--	--	0.22	--	--
24	I-405 SB Direct Off Ramp	Woodruff Ave	Unsignalized Off Ramp	0.52	--	--	0.41	--	--
25	I-405 SB Direct On Ramp	Woodruff Ave	Unsignalized On Ramp	0.43	--	--	0.24	--	--
26	I-405 NB Direct Off Ramp	Palo Verde	Existing Traffic Signal	0.84	17.0	B	0.69	11.8	B
27	I-405 NB Loop On Ramp	Palo Verde	Unsignalized On Ramp	0.14	--	--	0.22	--	--
28	Woodruff Ave	Palo Verde	Existing Traffic Signal	0.84	13.8	B	0.69	9.7	A
29	Stearns St	Palo Verde	Existing Traffic Signal	0.94	22.1	C	0.92	22.9	C
30	Stearns St	I-405 SB Direct On Ramp	Unsignalized Intersection	0.35	--	--	0.46	--	--
31	I-405 NB Direct On Ramp	Studebaker Rd	Existing Traffic Signal	0.63	4.1	A	0.52	4.0	A
32	I-405 SB Direct Off Ramp	Studebaker Rd	Unsignalized Intersection	1.04	80.0	F	0.44	20.4	C
33	Atterton St	Studebaker Rd	Existing Traffic Signal	0.57	8.8	A	0.81	14.6	B
34	SR-22 NB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.51	12.8	B	0.87	30.2	C
35	SR-22 SB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.98	28.8	C	0.97	29.0	C
36	SR-22 WB On/Off Ramp	College Park Dr	Unsignalized Intersection	0.12	19.7	C	0.32	92.6	F
37	7th St	Pacific Coast Highway	Existing Traffic Signal	0.92	35.7	D	0.96	36.9	D
38	7th St	Bellflower Blvd	Existing Traffic Signal	1.09	66.4	E	1.01	49.6	D
39	Pacific Coast Highway	Bellflower Blvd	Existing Traffic Signal	0.54	30.2	C	0.75	22.1	C
40	7th St	Chanel Dr	Existing Traffic Signal	0.75	8.2	A	0.95	25.4	C
41	7th St	W. Campus Dr	Existing Traffic Signal	0.80	34.6	C	0.86	47.4	D
42	7th St	E. Campus Dr	Existing Traffic Signal	1.05	45.2	D	0.90	16.0	B

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

No.	Location		Movement	Available Storage (ft)	2020 Alternative 3 Conditions			
	East/West Street	North/South Street			AM Peak Hour		PM Peak Hour	
					95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
1	Carson St	I-605 SB Off Ramp	SBL	300	136	Yes	193	Yes
			SBT	1,130	78	Yes	95	Yes
			SBR	300	170	Yes	107	Yes
3	Carson St	I-605 NB Off Ramp	NBL	300 (650)	229	Yes	280	Yes
			NBR	300 (1175)	232	Yes	141	Yes
			NBL	120	244	No	270	No
4	Carson St	Pioneer Blvd	SBL	140	77	Yes	78	Yes
			SBR	140	74	Yes	83	Yes
			EBL	250	284	No	405	No
			WBL	80	17	Yes	18	Yes
			SBL	270 (1,240)	281	Yes	159	Yes
5	Spring St/Cerritos Ave	I-605 SB Off Ramp	SBR	900	0	Yes	0	Yes
6	Spring St/Cerritos Ave	I-605 NB On Ramp	WBL	260	217	Yes	109	Yes
9	Willow St	Lakewood Blvd	NBL	180	194	Yes	137	Yes
			SBL	150	43	Yes	119	Yes
			EBL	175	82	Yes	74	Yes
11	I-405 NB Off Ramp	Bellflower Blvd	WBL	150	31	Yes	143	Yes
			WBL	1,870	71	Yes	175	Yes
			WBL/R	1,130	56	Yes	173	Yes
12	Willow St	Bellflower Blvd	WBR	410	50	Yes	162	Yes
			NBL	150	362	No	82	Yes
			SBL	120	0	Yes	252	No
13	Willow St	Bellflower Blvd	EBL	140	175	Yes	153	No
			WBL	110	246	No	338	No
			NBL	160	27	Yes	37	Yes
15	Los Coyotes Diagonal	Bellflower Blvd	NBR	280	50	Yes	159	Yes
			EBL	190	267	No	630	No
			WBL	150	160	No	163	No
16	Los Coyotes Diagonal	I-405 SB Direct Off Ramp	SBL	1525 (500)	139	Yes	120	Yes
17	Willow St	Los Coyotes Diagonal	SBL	120	165	No	367	No
			EBL	140	87	Yes	51	Yes
			WBL	160	346	No	673	No
20	Willow St	Woodruff Ave	NBL	140	628	No	207	No
			NBR	60	36	Yes	26	Yes
			SBL	120	149	No	110	Yes
			SBR	120	149	No	70	Yes
			EBL	200	292	No	161	Yes
21	I-405 NB Direct Off Ramp	Palo Verde	WBL	180	241	No	167	Yes
			WBL	550	376	Yes	283	Yes
			WBL/R	1,155	63	Yes	147	Yes
22	Woodruff Ave	Palo Verde	EBL	335	289	Yes	202	Yes
			EBR	335	286	Yes	168	Yes
			NBL	130	184	No	179	No
24	Stearns St	Palo Verde	SBL	120	86	Yes	136	No
			EBL	90	231	No	214	No
			WBL	80	40	Yes	115	No
26	I-405 NB Direct On Ramp	Studebaker Rd	NBL	100	82	Yes	63	Yes
			SBR	70	16	Yes	21	Yes

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

No.	Location		Movement	Available Storage (ft)	2020 Alternative 3 Conditions			
	East/West Street	North/South Street			AM Peak Hour		PM Peak Hour	
					95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
26	Atherton St	Studebaker Rd	NBL	200	44	Yes	58	Yes
			SBL	260	1	Yes	2	Yes
			SBR	70	14	Yes	13	Yes
			EBL	120	79	Yes	273	No
			WBL	220	29	Yes	26	Yes
27	SR-22 WB On/Off Ramp	Studebaker Rd	NBR	150	14	Yes	27	Yes
			SBL	200	66	Yes	131	Yes
28	SR-22 EB On/Off Ramp	Studebaker Rd	NBR	300	1110	No	1004	No
			SBL	150	377	No	271	No
			WBR	50	52	Yes	208	No
30	7th St	Pacific Coast Highway	NBL	330	189	Yes	252	Yes
			SBL	230	873	No	354	No
31	7th St	Bellflower Blvd	NBR	130	81	Yes	27	Yes
			SBL	160	213	No	269	No
			SBR	160	95	Yes	362	No
			EBL	200	498	No	403	No
			WBL	200	39	Yes	58	Yes
32	Pacific Coast Highway	Bellflower Blvd	NBL	280	98	Yes	79	Yes
			SBL	240	267	No	218	Yes
			SBR	60	21	Yes	33	Yes
			EBL	110	33	Yes	131	No
			WBL	120	56	Yes	60	Yes
			WBR	200	65	Yes	41	Yes
33	7th St	Channel Dr	EBL	270	105	Yes	27	Yes
			EBR	180	1	Yes	7	Yes
			WBL	280	85	Yes	204	Yes
34	7th St	W Campus Dr	SBL/R	150	67	Yes	248	No
			EBL	400	109	Yes	48	Yes
35	7th St	E Campus Dr	SBL	150	76	Yes	183	No
			SBL/R	150	68	Yes	108	Yes
			EBL	150	196	No	94	Yes
			WBL	300	76	Yes	120	Yes

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

No	Location		Traffic Control/Comments	Alternative 3 (Year 2040) LOS					
	East/West Street	North/South Street		AM Peak Hour			PM Peak Hour		
				D/C	Avg Delay (sec)	LOS	D/C	Avg Delay (sec)	LOS
1	Carson St	I-405 SB Off Ramp	Existing Traffic Signal	0.69	11.7	B	0.80	14.1	B
2	Carson St	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.26	--	--	0.34	--	--
		I-405 SB Loop On Ramp	Unsignalized On Ramp	0.36	--	--	0.39	--	--
		I-405 NB Off Ramp	Existing Traffic Signal	0.66	22.9	C	0.81	19.4	B
		I-405 NB Loop On Ramp	Unsignalized On Ramp	0.31	--	--	0.33	--	--
3	Carson St	I-405 NB Direct On Ramp	Unsignalized On Ramp	0.55	--	--	0.49	--	--
4	Carson St	Pioneer Blvd	Existing Traffic Signal	0.84	37.3	D	0.92	44.5	D
5	Spring St/Cerritos Ave	I-405 SB Off Ramp	Existing Traffic Signal	0.75	15.5	B	0.64	10.7	B
6	Spring St/Cerritos Ave	I-405 NB On Ramp	Existing Traffic Signal	0.80	7.3	A	0.81	6.0	A
7	I-405 NB Direct Off Ramp	I-405 NB Direct Off Ramp	Unsignalized Off Ramp	0.47	--	--	0.46	--	--
		I-405 NB Direct On Ramp	Unsignalized On Ramp	0.41	--	--	0.25	--	--
		I-405 NB Loop Off Ramp	Unsignalized Off Ramp	0.30	--	--	0.28	--	--
		I-405 NB Loop On Ramp	Unsignalized On Ramp	0.57	--	--	0.45	--	--
8	I-405 SB Direct Off Ramp	Lakewood Blvd	Unsignalized On Ramp	0.25	--	--	0.29	--	--
		Lakewood Blvd	Unsignalized Off Ramp	0.48	--	--	0.50	--	--
9	Willow St	Lakewood Blvd	Existing Traffic Signal	0.77	32.4	C	1.02	52.0	D
10	Willow St	I-405 SB Loop Off Ramp	Unsignalized Off Ramp	0.38	--	--	0.49	--	--
		I-405 SB Direct On Ramp	Unsignalized On Ramp	0.33	--	--	0.46	--	--
		I-405 NB Off Ramp	Existing Traffic Signal	0.45	9.7	A	0.58	11.7	B
		I-405 NB Loop On Ramp	Unsignalized On Ramp	0.59	--	--	0.39	--	--
11	I-405 NB Direct On Ramp	Bellflower Blvd	Unsignalized On Ramp	0.34	--	--	0.19	--	--
		Bellflower Blvd	Existing Traffic Signal	0.93	37.7	D	1.25	105.9	F
12	Willow St	Bellflower Blvd	Existing Traffic Signal	0.89	26.0	C	1.22	65.5	F
13	Los Coyotes Diagonal	I-405 SB Direct On Ramp	Unsignalized On Ramp	0.09	--	--	0.13	--	--
14	I-405 SB Direct Off Ramp	Bellflower Blvd	Unsignalized On Ramp	0.13	--	--	0.40	--	--
15	Los Coyotes Diagonal	I-405 SB Direct Off Ramp	Existing Traffic Signal	0.58	11.4	B	0.56	10.2	B
16	Willow St	I-405 SB Loop On Ramp	Unsignalized On Ramp	0.35	--	--	0.19	--	--
17	Willow St	Los Coyotes Diagonal	Existing Traffic Signal	0.86	42.0	D	1.41	92.7	F
18	I-405 NB Direct Off Ramp	Woodruff Ave	Existing Traffic Signal	1.40	166.5	F	0.88	42.2	D
19	I-405 SB Direct On Ramp	Woodruff Ave	Unsignalized Off Ramp	0.43	--	--	0.24	--	--
		Woodruff Ave	Unsignalized On Ramp	0.34	--	--	0.23	--	--
20	I-405 NB Direct Off Ramp	Woodruff Ave	Unsignalized Off Ramp	0.56	--	--	0.45	--	--
		Woodruff Ave	Unsignalized On Ramp	0.46	--	--	0.26	--	--
21	Palo Verde	Existing Traffic Signal	1.02	22.9	C	0.80	14.0	B	
22	Palo Verde	Existing Traffic Signal	0.92	16.9	B	0.75	10.3	B	
23	Palo Verde	Existing Traffic Signal	1.03	30.8	C	1.02	29.9	C	
24	I-405 NB Direct On Ramp	Studebaker Rd	Existing Traffic Signal	0.38	--	--	0.50	--	--
25	I-405 SB Direct Off Ramp	Studebaker Rd	Unsignalized Intersection	0.68	4.5	A	0.56	3.9	A
26	Atherton St	Studebaker Rd	Existing Traffic Signal	1.20	116.8	F	0.45	20.1	C
27	SR-22 WB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.62	9.7	A	0.88	17.1	B
28	SR-22 EB On/Off Ramp	Studebaker Rd	Existing Traffic Signal	0.55	13.2	B	0.94	35.2	D
29	SR-22 WB On/Off Ramp	College Park Dr	Existing Traffic Signal	1.02	37.5	D	1.10	44.4	D
30	SR-22 WB On/Off Ramp	College Park Dr	Unsignalized Intersection	0.15	22.8	C	0.45	158.2	F
31	7th St	Pacific Coast Highway	Existing Traffic Signal	1.04	55.9	E	1.04	49.7	D
32	7th St	Bellflower Blvd	Existing Traffic Signal	1.17	72.3	E	1.10	57.0	E
33	Pacific Coast Highway	Bellflower Blvd	Existing Traffic Signal	0.58	26.9	C	0.88	26.8	C
34	7th St	Channel Dr	Existing Traffic Signal	0.77	10.2	B	1.04	39.1	D
35	7th St	W Campus Dr	Existing Traffic Signal	0.87	60.0	E	0.93	71.3	E
36	7th St	E Campus Dr	Existing Traffic Signal	1.14	59.3	E	0.99	18.9	B

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

No	Location		Movement	Available Storage (ft)	2040 Alternative 3 Conditions			
	East/West Street	North/South Street			AM Peak Hour		PM Peak Hour	
					95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
1	Carson St	I-605 SB Off Ramp	SBL	300	150	Yes	215	Yes
			SBT	1,130	85	Yes	104	Yes
			SBR	300	212	Yes	119	Yes
3	Carson St	I-605 NB Off Ramp	NBL	300 (690)	246	Yes	307	Yes
			NBR	300 (1175)	255	Yes	153	Yes
			NBL	120	277	No	302	No
4	Carson St	Pioneer Blvd	SBL	140	82	Yes	84	Yes
			SBR	140	77	Yes	86	Yes
			EBL	250	309	No	453	No
			WBL	80	17	Yes	18	Yes
5	Spring St/Cerritos Ave	I-605 SB Off Ramp	SBL	220 (1240)	310	Yes	174	Yes
6	Spring St/Cerritos Ave	I-605 NB On Ramp	SBR	900	0	Yes	0	Yes
			WBL	260	234	Yes	138	Yes
			NBL	180	141	Yes	160	Yes
9	Willow St	Lakewood Blvd	SBL	150	51	Yes	132	Yes
			EBL	175	90	Yes	85	Yes
			WBL	150	36	Yes	167	No
			WBL	1,870	72	Yes	194	Yes
11	I-405 NB Off Ramp	Bellflower Blvd	WBL/T/R	1,130	60	Yes	209	Yes
			WBR	410	54	Yes	189	Yes
			NBL	150	416	No	81	Yes
12	Willow St	Bellflower Blvd	SBL	120	109	Yes	282	No
			EBL	140	123	Yes	144	No
			WBL	110	265	No	356	No
13	Los Coyotes Diagonal	Bellflower Blvd	NBL	160	28	Yes	41	Yes
			NBR	230	51	Yes	194	Yes
			EBL	190	260	No	701	No
15	Los Coyotes Diagonal	I-405 SB Direct Off Ramp	WBL	150	175	No	158	No
16	Willow St	Los Coyotes Diagonal	SBL	1525 (500)	150	Yes	128	Yes
			SBL	120	197	No	405	No
			EBL	140	116	Yes	94	Yes
17	Willow St	Woodruff Ave	WBL	160	368	No	762	No
			NBL	140	710	No	240	No
			NBR	60	39	Yes	20	Yes
			SBL	120	157	No	116	Yes
20	I-405 NB Direct Off Ramp	Palo Verde	SBR	120	161	No	76	Yes
			EBL	200	378	No	165	Yes
			WBL	180	265	No	199	No
			WBL	550	480	Yes	329	Yes
21	Woodruff Ave	Palo Verde	WBL/T/R	1,155	78	Yes	179	Yes
22	Stearns St	Palo Verde	EBL	335	334	Yes	241	Yes
			EBR	335	333	Yes	194	Yes
			NBL	130	202	No	197	No
			SBL	120	84	Yes	113	Yes
24	I-405 NB Direct On Ramp	Studebaker Rd	EBL	90	250	No	230	No
			WBL	80	42	Yes	132	No
			NBL	100	83	Yes	66	Yes
			SBR	70	19	Yes	22	Yes

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

No.	Location		Movement	Available Storage (ft)	2040 Alternative 3 Conditions			
	East/West Street	North/South Street			AM Peak Hour		PM Peak Hour	
					95th Percentile Queue (ft)	Adequate Storage? (Yes or No)	95th Percentile Queue (ft)	Adequate Storage? (Yes or No)
26	Atherton St	Studebaker Rd	NBL	200	100	Yes	66	Yes
			SBL	260	1	Yes	2	Yes
			SBR	70	11	Yes	21	Yes
			EBL	120	86	Yes	249	No
			WBL	220	31	Yes	27	Yes
27	SR-22 WB On/Off Ramp	Studebaker Rd	NBR	150	14	Yes	32	Yes
			SBL	200	71	Yes	189	Yes
28	SR-22 EB On/Off Ramp	Studebaker Rd	NBR	300	1288	No	1154	No
			SBL	150	418	No	302	No
			WBR	60	55	Yes	316	No
30	7th St	Pacific Coast Highway	NBL	330	200	Yes	302	Yes
			SBL	290	368	No	406	No
31	7th St	Bellflower Blvd	NBR	130	63	Yes	35	Yes
			SBL	160	230	No	306	No
			SBR	160	126	Yes	302	No
			EBL	200	495	No	421	No
			WBL	200	44	Yes	64	Yes
32	Pacific Coast Highway	Bellflower Blvd	NBL	280	107	Yes	84	Yes
			SBL	240	263	No	81	Yes
			SBR	60	7	Yes	2	Yes
			EBL	110	54	Yes	253	No
			WBL	120	54	Yes	67	Yes
			WBR	200	61	Yes	42	Yes
33	7th St	Channel Dr	EBL	270	116	Yes	28	Yes
			EBR	180	1	Yes	7	Yes
			WBL	280	107	Yes	213	Yes
34	7th St	W Campus Dr	SBL/R	150	73	Yes	276	No
			EBL	400	90	Yes	5	Yes
35	7th St	E Campus Dr	SBL	150	82	Yes	213	No
			SBL/R	150	71	Yes	128	Yes
			EBL	150	224	No	99	Yes
			WBL	300	80	Yes	147	Yes

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GL-9 (Continued)

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Location	Lane Type	Direction	Mainline		Alternative 3 (Year 2020) Conditions								
			Lanes	Capacity ^{1,2}	Traffic Demand Volume ³	AM Peak Hour			PM Peak Hour				
						D/C	Density ⁴	LOS ⁵	Traffic Demand Volume ³	D/C	Density ⁴	LOS ⁵	
I-405 Mainline													
Temple Avenue to Lakeswood Boulevard/Willow Street	GP	NB	3	9,250	9,800	1.07	—	F	10,550	11,140	—	—	F
		SB	5	9,250	9,910	1.07	87.9	E	10,330	11,110	—	—	F
		NB	3	1,850	1,850	1.00	—	—	7,040	1,100	—	—	F
		SB	1	1,850	1,660	0.90	—	—	1,890	1,060	—	—	—
Lakeswood Boulevard/Willow Street to Bellflower Boulevard	HOV	NB	3	9,250	—	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—	—
		NB	3	1,850	1,850	1.00	—	—	2,060	1,110	—	—	—
		SB	1	1,850	1,660	0.90	—	—	2,180	1,150	—	—	—
Bellflower Boulevard to Woodruff Avenue	GP	NB	3	9,250	—	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—	—
		NB	3	1,850	1,870	1.01	—	—	1,870	1,010	—	—	—
		SB	1	1,850	1,680	0.91	—	—	2,130	1,150	—	—	—
Woodruff Avenue to Palo Verde Avenue/Stearns Street	GP	NB	3	9,250	—	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—	—
		NB	3	1,850	1,820	0.98	—	—	1,820	1,000	—	—	—
		SB	1	1,850	1,740	0.94	—	—	2,130	1,150	—	—	—
Palo Verde Avenue/Stearns Street to Studebaker Road	GP	NB	3	9,250	—	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—	—
		NB	3	1,850	1,860	1.00	—	—	1,850	1,000	—	—	—
		SB	1	1,850	1,740	0.94	—	—	2,130	1,150	—	—	—
Studebaker Road to I-405 NB Off Ramp	GP	NB	3	9,250	—	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—	—
		NB	3	1,850	1,860	1.00	—	—	1,850	1,000	—	—	—
		SB	1	1,850	1,740	0.94	—	—	2,130	1,150	—	—	—
I-405 NB Off Ramp to 7th St Off Ramp	GP	NB	3	9,250	—	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—	—
		NB	3	1,850	1,860	1.00	—	—	1,850	1,000	—	—	—
		SB	1	1,850	1,740	0.94	—	—	2,130	1,150	—	—	—
7th St Off Ramp to I-405 SB On Ramp	GP	NB	3	9,250	—	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—	—
		NB	3	1,850	1,860	1.00	—	—	1,850	1,000	—	—	—
		SB	1	1,850	1,740	0.94	—	—	2,130	1,150	—	—	—
I-405 Mainline													
Cinco Street to Spring Street	GP	NB	3	7,460	7,740	0.78	25.0	C	6,530	6,880	33.5	D	D
		SB	4	7,460	7,730	1.04	37.4	C	7,600	8,030	37.8	E	E
		NB	3	1,850	1,850	0.81	—	—	1,720	6.95	—	—	—
		SB	1	1,850	1,406	0.81	—	—	1,400	6.75	—	—	—
Spring Street to Willow Street/Katella Ave	HOV	NB	4	7,460	4,980	0.67	20.3	C	5,500	7.74	24.5	E	E
		SB	4	7,460	5,620	0.90	28.5	D	6,150	6.84	25.8	C	C
		NB	3	1,850	1,850	0.81	—	—	1,670	5.61	—	—	—
		SB	1	1,850	1,400	0.81	—	—	1,400	6.70	—	—	—
Willow Street/Katella Ave CD Road On Ramp to I-405	GP	NB	4	4,760	5,010	0.54	16.6	B	5,750	6.62	20.9	C	C
		SB	4	7,460	5,860	0.76	24.5	C	5,500	7.74	26.2	D	D
		NB	3	1,850	1,870	0.74	—	—	1,800	5.97	—	—	—
		SB	1	1,850	1,360	0.74	—	—	1,400	6.70	—	—	—
7th Street Mainline													
Pepper Tree Lane to Studebaker Road	GP	EB	2	2,700	2,850	0.88	15.8	B	2,700	2,740	14.6	B	B
		WB	3	5,550	5,860	0.70	20.7	C	5,880	6,080	20.5	C	C
		EB	2	2,700	2,850	0.88	15.8	B	2,700	2,740	14.6	B	B
		WB	3	5,700	6,110	1.11	40.9	E	6,850	1.93	—	—	F
Studebaker Road to I-405	GP	EB	2	2,700	2,850	0.88	15.8	B	2,700	2,740	14.6	B	B
		WB	3	5,550	5,860	0.70	20.7	C	5,880	6,080	20.5	C	C
		EB	2	2,700	2,850	0.88	15.8	B	2,700	2,740	14.6	B	B
		WB	3	5,700	6,110	1.11	40.9	E	6,850	1.93	—	—	F

Notes:
1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS): General Purpose (GP) lane based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS F.
4. Peak hour capacities for freeway lanes include 1,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
5. Density is in excess of 45 pc/mi/ln; therefore LOS is F.

Long Beach Area Traffic Study

I-405 Improvement Project Supplemental Traffic Study

Interchange	Ramp Type	Ramp Lanes	Ramp ^{1,4} Capacity	Alternative 3 (Year 2020) Conditions							
				AM Peak		PM Peak					
				Ramp	Ramp Junction	Ramp	Ramp Junction				
				Traffic Volume ¹	D/C	Traffic Volume ¹	D/C	Density ⁷	LOS ^{3,5}		
				LOS ^{3,5}	Density ⁷	LOS ^{3,5}	Density ⁷				
I-405 Ramp Junctions											
Lakeswood Blvd & Willow St	NB Off Direct	2	3,000	1,000	0.33	14.7	0.33	590	0.33	16.7	F
	NB On Loop	1	1,500	790	0.53	46.9	F	620	0.41	52.8	F
	NB On Direct	1	1,500	560	0.37	25.9	C	340	0.23	28.4	F
	SB Off Direct + Loop	2	3,000	1,150	0.40	18.5	B	1,370	0.46	20.6	F
Bellflower Blvd & Los Coyotes Diagonal	SB On Loop	2	3,000	320	0.21	43.4	F	410	0.27	44.1	F
	SB On Direct (from Willows St)	1	1,500	450	0.30	22.4	C	620	0.41	23.0	C
	NB Off Direct	1	1,500	520	0.35	28.1	D	570	0.38	33.4	F
	NB On Direct + Loop	2	3,000	1,250	0.43	15.2	F	860	0.29	14.3	F
Woodruff Ave	SB Off Direct + Loop	2	3,000	1,450	0.48	17.7	B	1,990	0.66	22.6	F
	SB On Direct + Loop	1	1,500	980	0.65	35.6	F	1,410	0.94	34.6	F
	NB Off Direct	1	1,500	600	0.40	24.5	C	330	0.22	27.6	C
	NB On Direct	1	1,500	470	0.31	36.0	F	320	0.21	43.0	F
Palo Verde Ave & Stearns St	SB Off Direct	1	1,500	780	0.52	35.6	F	570	0.38	38.8	F
	SB On Direct	1	1,500	640	0.43	23.5	F	300	0.20	25.3	F
	NB Off Direct	1	1,500	660	0.44	25.4	C	800	0.53	30.9	F
	NB On Loop	1	1,500	210	0.14	54.8	F	320	0.21	62.7	F
Studebaker Rd	SB On Direct (from Stearns St)	1	1,500	530	0.35	26.7	F	630	0.42	26.9	F
	NB On Direct	1	1,500	310	0.21	56.8	F	310	0.21	66.0	F
	SB Off Direct	1	1,500	410	0.27	36.2	E	260	0.17	36.5	E
		1	1,500	60	0.07	35.6	F	160	0.11	38.8	E

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GL-9 (Continued)

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study Long Beach Area Traffic Study

Table 4.6-6: Alternative 3 (Year 2020) Ramp Junction Peak Hour Level of Service									
Interchange	Ramp Type	Ramp Lanes	Ramp Capacity	Alternative 3 (Year 2020) Conditions					
				AM Peak			PM Peak		
				Ramp Traffic Volume ¹	D/C	Density ²	Ramp Junction LOS ^{3,4}	Ramp Traffic Volume ¹	D/C Density ² LOS ^{3,4}
I-405 Ramp Junctions									
Carlson St	NB Off Direct	1	1,500	1,020	0.68	31.7	D	940	0.63 34.6 D
	NB On Loop	1	1,500	430	0.29	19.7	B	460	0.31 22.4 C
	NB On Direct	1	1,500	770	0.51	20.2	C	690	0.46 22.0 C
	SB Off Direct	2	3,000	1,220	0.41	13.6	B	1,410	0.47 15.0 B
	SB On Loop	1	1,500	500	0.33	22.1	C	460	0.31 21.8 C
	SB On Direct	1	1,500	280	0.19	22.6	C	320	0.21 22.2 C
Spring St/Cerritos Ave	NB On Loop	1	1,500	760	0.51	18.3	B	1,030	0.69 19.4 B
	SB Off Direct	1	1,500	1,070	0.71	34.8	D	1,410	0.94 36.2 F
	NB Off (Direct + Loop)	1	1,500	1,070	0.71	0.4	A	1,660	1.11 5.5 A
Willow St/Katella Ave	NB On Direct	1	1,500	1,040	0.69	19.4	B	1,410	0.95 20.9 C
	SB Off Direct	1	1,500	530	0.35	33.7	D	500	0.38 31.5 D
	SB Off Loop	1	1,500	1,070	0.71	34.4	D	1,010	0.67 32.1 D
	SB On Direct (Direct + Loop)	1	1,500	590	0.39	23.7	C	810	0.54 22.8 C
7th Street Ramp Junctions									
Studebaker Rd	EB Off Loop	1	1,500	130	0.09	32.0	D	660	0.44 29.9 D
	EB On Loop	1	1,500	1,230	0.82	37.7	F	1,410	0.95 32.3 D
	WB Off Loop	1	1,500	780	0.52	42.6	F	1,410	0.95 49.7 F
	WB On Loop	1	1,500	540	0.36	29.1	D	490	0.33 3.0 A

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I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.6-6: Alternative 3 (Year 2020) Ramp Junction Peak Hour Level of Service									
Interchange	Ramp Type	Ramp Lanes	Ramp Capacity	Alternative 3 (Year 2020) Conditions					
				AM Peak			PM Peak		
				Ramp Traffic Volume ¹	D/C	Density ²	Ramp Junction LOS ^{3,4}	Ramp Traffic Volume ¹	D/C Density ² LOS ^{3,4}
Freeway - to - Freeway Branch Connectors⁵									
I-405/I-605 Freeway Interchanges	I-605 SB to I-405 NB	1	1,800	790	0.44	--	--	1,000	0.56 --
	I-605 SB/7th St to I-405 NB	2	3,600	1,460	0.41	--	--	1,450	0.40 --
	I-405 SB to I-605 NB	2	3,600	1,310	0.36	--	--	1,130	0.31 --
	I-605 SB to 7th St/I-405 SB	2	3,600	4,860	1.35	--	--	4,500	1.25 --
	I-605 SB/I-405 SB to 7th St	1	1,800	2,020	1.12	--	--	1,930	1.07 --
	7th St to I-605 NB/I-405 NB	2	3,600	1,340	0.37	--	--	1,170	0.33 --
	7th St to I-405 NB	1	1,800	720	0.40	--	--	430	0.24 --

- Notes:
1. Peak hour capacity and traffic demand forecast volumes are shown in vehicles per hour (vph).
 2. Density is shown in passenger cars/mile/line (pc/mi/ln).
 3. Level of Service (LOS) is based on density (pc/mi/ln). D/C - demand-to-capacity ratio.
 4. Peak hour capacities for freeway ramps include 1,500 vph for each freeway ramp lane and 1,800 vph for each freeway-to-freeway branch connector lane.
 5. LOS F as the total flow of the merge/diverge area exceeds the capacity of the freeway segment, the density is not applicable in this case.
 6. * Per Highway Capacity Manual, as the impact area of merge and diverge is primarily focused on an influence area of 1,500 ft, the density was not calculated for areas exceeding 1,500 ft in length.
 7. For freeway-to-freeway branch connectors, D/C ratios are provided.

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GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.6-7: Alternative 3 (Year 2020) Weaving Level-of-Service Freeway and Collector-Distributor Roads				
Weaving Segment	AM Peak Hour		PM Peak Hour	
	Density ¹	LOS ²	Density ¹	LOS ²
Freeway Mainline				
I-405 Southbound - Lakewood Boulevard/Willow Street to Bellflower Boulevard	46.4	F	73.4	F
I-405 Northbound - Bellflower Boulevard to Lakewood Boulevard/Willow Street	50.2	F	43.5	F
I-405 Southbound - Bellflower Boulevard to Woodruff Avenue	42.8	E	68.6	F
I-405 Northbound - Woodruff Avenue to Bellflower Boulevard	55.0	F	50.3	F
I-405 Northbound - Palo Verde Avenue/Stearns Street to Woodruff Avenue	48.6	F	42.8	E
I-405 Southbound - Palo Verde Avenue/Stearns Street to Studebaker Road	34.5	D	45.6	F
I-405 Northbound - Studebaker Road to Palo Verde Avenue/Stearns Street	46.1	F	47.8	F
Collector-Distributor (C-D) Roads				
Lakewood Boulevard/Willow Street Interchange at I-405				
Southbound C-D Road	16.2	B	22.5	C
Bellflower Boulevard/Los Coyotes Diagonal Interchange at I-405				
Southbound C-D Road	5.0	A	3.8	A

Notes:

1. Density is shown in passenger cars/mile/lane (pc/mi/ln).
2. Level of Service (LOS) is based on density (pc/mi/ln). The density LOS thresholds are different for the freeway mainline and collector-distributor roads.

GL-9 (Continued)

I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.6-8: Alternative 3 (Year 2040) Mainline Peak Hour Level of Service												
Location	Lane Type	Direction	Mainline		Alternative 3 (Year 2040) Conditions							
			Lanes	Capacity ¹	AM Peak Hour				PM Peak Hour			
					Traffic Demand Volume ²	D/C	Density ³	LOS ³	Traffic Demand Volume ²	D/C	Density ³	LOS ³
I-405 Mainline												
Temple Avenue to Lakewood Boulevard/Willow Street	GP	NB	5	9,250	10,730	1.16	—	F	11,410	1.29	—	F
		SB	5	9,250	10,710	1.16	—	F	11,430	1.29	—	F
	HOV	NB	1	1,850	1,000	1.08	—	—	2,700	1.25	—	—
		SB	1	1,850	1,000	0.97	—	—	2,120	1.15	—	—
Lakewood Boulevard/Willow Street to Bellflower Boulevard	GP	NB	5	9,250	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—
	HOV	NB	1	1,850	1,970	1.06	—	—	2,220	1.20	—	—
		SB	1	1,850	1,000	0.97	—	—	2,300	1.24	—	—
Bellflower Boulevard to Woodruff Avenue	GP	NB	5	9,250	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—
	HOV	NB	1	1,850	2,020	1.09	—	—	2,020	1.29	—	—
		SB	1	1,850	1,620	0.98	—	—	2,300	1.24	—	—
Woodruff Avenue to Palo Verde Avenue/Stearns Street	GP	NB	5	9,250	—	—	—	—	—	—	—	—
		SB	4	7,400	8,610	1.10	—	F	9,850	1.33	—	F
	HOV	NB	1	1,850	2,970	1.09	—	—	2,300	1.26	—	—
		SB	1	1,850	1,840	1.03	—	—	2,300	1.24	—	—
Palo Verde Avenue/Stearns Street to Studebaker Road	GP	NB	5	9,250	—	—	—	—	—	—	—	—
		SB	5	9,250	—	—	—	—	—	—	—	—
	HOV	NB	1	1,850	1,800	0.97	—	—	2,000	1.08	—	—
		SB	1	1,850	1,800	1.02	—	—	2,130	1.15	—	—
Studebaker Road to I-405 NB Off Ramp	GP	NB	4	7,400	9,830	1.33	—	F	11,330	1.53	—	F
		SB	5	9,250	9,730	1.05	37.2	E	20,240	1.11	—	F
	HOV	NB	1	1,850	2,240	1.31	—	—	2,480	1.34	—	—
		SB	1	1,850	1,910	1.03	—	—	2,130	1.15	—	—
I-405 NB Off Ramp to 7th St Off Ramp	GP	NB	1	7,400	9,830	1.33	—	F	11,330	1.53	—	F
		SB	4	7,400	8,320	1.12	43.4	E	6,030	1.22	—	F
	HOV	NB	1	1,850	2,240	1.31	—	—	2,480	1.34	—	—
		SB	1	1,850	1,950	1.03	—	—	2,110	1.15	—	—
7th St Off Ramp to I-405 SB On Ramp	GP	NB	4	7,400	8,260	1.12	—	F	9,780	1.32	—	F
		SB	4	7,400	8,220	1.11	42.3	E	8,650	1.20	—	F
	HOV	NB	1	1,850	2,240	1.31	—	—	2,470	1.34	—	—
		SB	1	1,850	1,910	1.03	—	—	2,130	1.15	—	—
I-405 Mainline												
Carson Street to Spring Street	GP	NB	4	7,400	8,210	0.94	27.4	D	7,050	0.95	14.0	D
		SB	4	7,400	8,350	1.18	—	F	8,220	1.11	—	F
	HOV	NB	1	1,850	1,620	0.88	—	—	1,900	1.01	—	—
		SB	1	1,850	1,620	0.88	—	—	1,520	0.89	—	—
Spring Street to Willow Street/Katella Ave	GP	NB	4	7,400	5,390	0.73	22.9	C	3,950	0.86	24.6	C
		SB	4	7,400	7,210	0.97	32.2	D	4,660	0.90	26.7	D
	HOV	NB	1	1,850	1,590	0.98	—	—	2,200	1.09	—	—
		SB	1	1,850	1,620	0.88	—	—	1,520	0.89	—	—
Willow Street/Katella Ave CD Road On Ramp to I-405	GP	NB	5	9,250	5,420	0.59	18.9	B	6,210	0.67	22.5	C
		SB	4	7,400	6,120	0.83	26.8	D	5,940	0.80	28.3	D
	HOV	NB	1	1,850	1,490	0.81	—	—	1,950	1.05	—	—
		SB	1	1,850	1,480	0.80	—	—	1,430	0.83	—	—
7th Street Mainline												
Pepper Tree Lane to Studebaker Road	GP	EB	2	3,700	2,830	0.80	15.8	B	2,790	0.74	14.6	D
		WB	3	5,550	3,860	0.70	20.7	C	3,830	0.69	20.5	C
	GP	EB	2	3,700	4,340	1.12	41.3	E	3,560	0.96	30.8	D
		WB	2	3,700	4,320	1.11	40.9	E	4,850	1.31	—	F

Notes:

1. Peak hour capacity and traffic volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS): General Purpose (GP) lane LOS is based on density except when demand-to-capacity (D/C) ratio is greater than or equal to 1.0, which is LOS F.
4. Peak hour roadways for freeway lanes include 1,850 vph for each GP lane and a single High Occupancy Vehicle (HOV) lane.
5. * Density is in excess of 45 pc/mi/ln therefore LOS is F.

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GL-9 (Continued)

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I-405 Improvement Project Supplemental Traffic Study Long Beach Area T1 Study

Table 4.6-9: Alternative 3 (Year 2040) Ramp Junction Peak Hour Level of Service

Interchange	Ramp Type	Ramp Lanes	Ramp Capacity	Alternative 3 (Year 2040) Conditions					
				AM Peak			PM Peak		
				Ramp	Ramp Junction	Ramp	Ramp Junction	Ramp	Ramp Junction
				Traffic Volume ¹	Density ²	LOS ^{3,4}	Traffic Volume ¹	Density ²	LOS ^{3,4}
I-405 Ramp Junctions									
Lakewood Blvd & Willow St	NB Off Direct	2	3,000	1,080	0.36	F	1,070	0.36	F
	NB On Loop	1	1,500	850	0.37	F	670	0.45	F
	NB On Direct	1	1,500	610	0.41	F	360	0.24	F
	SB Off Direct + Loop	2	3,000	1,250	0.43	F	1,480	0.48	F
Bellflower Blvd & Los Coyotes Diagonal	SB On Loop	1	1,500	340	0.23	F	440	0.29	F
	SB On Direct (from Willow St)	1	1,500	480	0.33	F	680	0.45	F
	NB Off Direct	1	1,500	560	0.37	F	620	0.41	F
	NB On Direct + Loop	2	3,000	1,390	0.46	F	900	0.31	F
Woodruff Ave	SB Off Direct + Loop	2	3,000	1,560	0.52	F	2,160	0.72	F
	SB On Direct + Loop	1	1,500	1,060	0.71	F	1,530	1.02	F
	NB Off Direct	1	1,500	650	0.43	F	360	0.24	F
	NB On Direct	1	1,500	510	0.34	F	350	0.23	F
Pala Verde Ave & Stearn St	SB Off Direct	1	1,500	840	0.56	F	520	0.41	F
	SB On Direct	1	1,500	680	0.48	F	330	0.22	F
	NB Off Direct	1	1,500	710	0.47	F	860	0.57	F
	NB On Loop	1	1,500	220	0.15	F	350	0.23	F
Sandblaster Rd	SB On Direct (from Stearn St)	1	1,500	570	0.38	F	680	0.45	F
	NB On Direct	1	1,500	330	0.22	F	340	0.23	F
	SB Off Direct	1	1,500	440	0.29	F	280	0.19	F
	SB On Direct	1	1,500	100	0.07	F	170	0.11	F

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I-405 Improvement Project Supplemental Traffic Study

Long Beach Area Traffic Study

Table 4.6-9: Alternative 3 (Year 2040) Ramp Junction Peak Hour Level of Service

Interchange	Ramp Type	Ramp Lanes	Ramp Capacity	Alternative 3 (Year 2040) Conditions					
				AM Peak			PM Peak		
				Ramp	Ramp Junction	Ramp	Ramp Junction	Ramp	Ramp Junction
				Traffic Volume ¹	Density ²	LOS ^{3,4}	Traffic Volume ¹	Density ²	LOS ^{3,4}
I-405 Ramp Junctions									
Carson St	NB Off Direct	1	1,500	1,100	0.73	D	1,020	0.68	E
	NB On Loop	1	1,500	460	0.31	C	490	0.33	C
	NB On Direct	1	1,500	830	0.55	F	740	0.49	F
	SB Off Direct	2	3,000	1,320	0.44	B	1,530	0.51	B
Spring St/Jurupa Ave	SB On Loop	1	1,500	540	0.36	C	500	0.33	C
	SB On Direct	1	1,500	300	0.20	F	350	0.23	F
	NB On Loop	1	1,500	820	0.55	F	1,110	0.74	C
	SB Off Direct	1	1,500	1,150	0.77	E	1,500	1.01	E
Willow St/Katella Ave	NB Off Direct	1	1,500	1,160	0.77	E	1,800	1.20	E
	NB On Direct + Loop	1	1,500	1,130	0.75	F	1,530	1.02	F
	SB Off Direct	1	1,500	570	0.38	F	540	0.36	F
	SB On Loop	1	1,500	1,150	0.77	E	1,090	0.73	D
Studebaker Rd	SB On Direct (Direct + Loop)	1	1,500	630	0.42	C	880	0.59	C
	SB Off Direct	1	1,500	140	0.09	F	720	0.48	D
	SB On Loop	1	1,500	1,330	0.80	F	1,540	1.03	D
	WB Off Loop	1	1,500	840	0.56	F	1,550	1.03	F
7th St	WB On Loop	1	1,500	580	0.39	D	540	0.36	D

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GL-9 (Continued)

GL-9 (Continued)

Long Beach Area Traffic Study

I-405 Improvement Project Supplemental Traffic Study

Table 4.6-9: Alternative 3 (Year 2040) Ramp Junction Peak Hour Level of Service

Interchange	Ramp Type	Ramp Lanes	Ramp Capacity	Alternative 3 (Year 2040) Conditions					
				AM Peak			PM Peak		
				Ramp	Ramp Junction	Ramp Junction	Ramp	Ramp Junction	Ramp Junction
				Traffic Volume ⁴	D/C ⁵	Density ¹	Traffic Volume ⁴	D/C ⁵	Density ¹
				Freeway - to - Freeway Branch Connectors ⁷					
I-405/I-405 Freeway Interchanges	I-405 SB to I-405 NB	1	1,800	860	0.48	-	1,080	0.60	-
	I-405 SB/7th St to I-405 NB	2	3,600	1,570	0.44	-	1,530	0.43	-
	I-405 SB to I-405 NB	2	3,600	1,410	0.39	-	1,220	0.34	-
	I-405 SB to 7th St/I-405 SB	2	3,600	5,260	1.46	-	4,870	1.35	-
	I-405 SB/I-405 SB to 7th St	1	1,800	2,020	1.12	-	1,930	1.07	-
	7th St to I-405 NB/I-405 NB	2	3,600	1,450	0.40	-	1,260	0.35	-
	7th St to I-405 NB	1	1,800	770	0.43	-	450	0.26	-

Notes:

1. Peak hour capacity and traffic demand forecast volumes are shown in vehicles per hour (vph).
2. Density is shown in passenger cars/mile/lane (pc/mi/ln).
3. Level of Service (LOS) is based on density (pc/mi/ln). D/C - demand-to-capacity ratio.
4. Peak hour capacities for freeway ramps include 1,500 vph for each freeway-to-freeway branch connector lane.
5. LOS F as the total flow of the merged/diverge area exceeds the capacity of the freeway segment; the density is not applicable in this case.
6. * Per Highway Capacity Manual, as the impact area of merge and diverge is primarily focused on an influence area of 1,500 ft, the density was not calculated for areas exceeding 1,500 ft in length.
7. For freeway-to-freeway branch connectors, D/C ratios are provided.

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Long Beach Area Traffic Study

**Table 4.6-10: Alternative 3 (Year 2040) Weaving Level-of-Serve
Freeway and Collector-Distributor Roads**

Weaving Segment	AM Peak Hour		PM Peak Hour	
	Density ¹	LOS ²	Density ¹	LOS ²
Freeway Mainline				
I-405 Southbound - Lakewood Boulevard/Willow Street to Bellflower Boulevard	51.3	F	81.2	F
I-405 Northbound - Bellflower Boulevard to Lakewood Boulevard/Willow Street	55.1	F	47.7	F
I-405 Southbound - Bellflower Boulevard to Woodruff Avenue	47.3	F	75.7	F
I-405 Northbound - Woodruff Avenue to Bellflower Boulevard	60.9	F	56.1	F
I-405 Northbound - Palo Verde Avenue/Stearns Street to Woodruff Avenue	53.4	F	47.3	F
I-405 Southbound - Palo Verde Avenue/Stearns Street to Studebaker Road	37.7	E	49.8	F
I-405 Northbound - Studebaker Road to Palo Verde Avenue/Stearns Street	50.8	F	53.0	F
Collector-Distributor (C-D) Roads				
Lakewood Boulevard/Willow Street Interchange at I-405				
Southbound C-D Road	16.2	B	22.5	C
Bellflower Boulevard/Los Coyotes Diagonal Interchange at I-405				
Southbound C-D Road	5.0	A	3.8	A

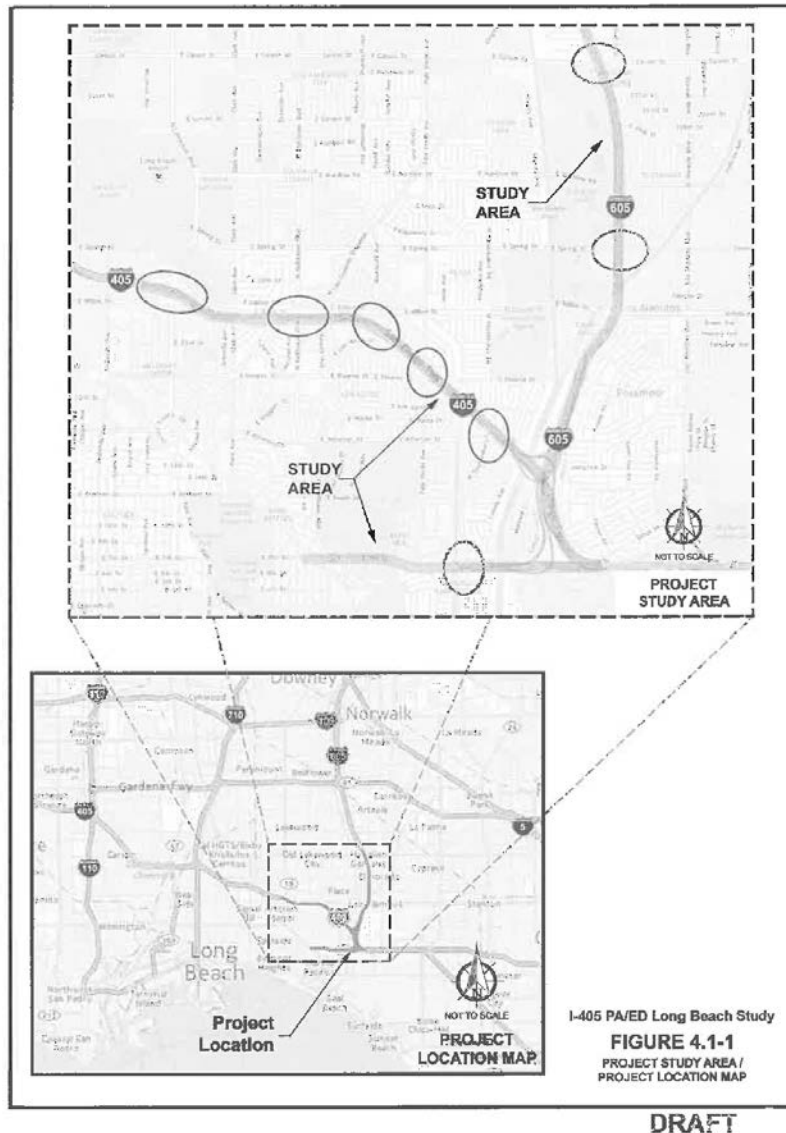
Notes:

1. Density is shown in passenger cars/mile/lane (pc/mi/ln).
2. Level of Service (LOS) is based on density (pc/mi/ln). The density LOS thresholds are different for the freeway mainline and collector-distributor roads.

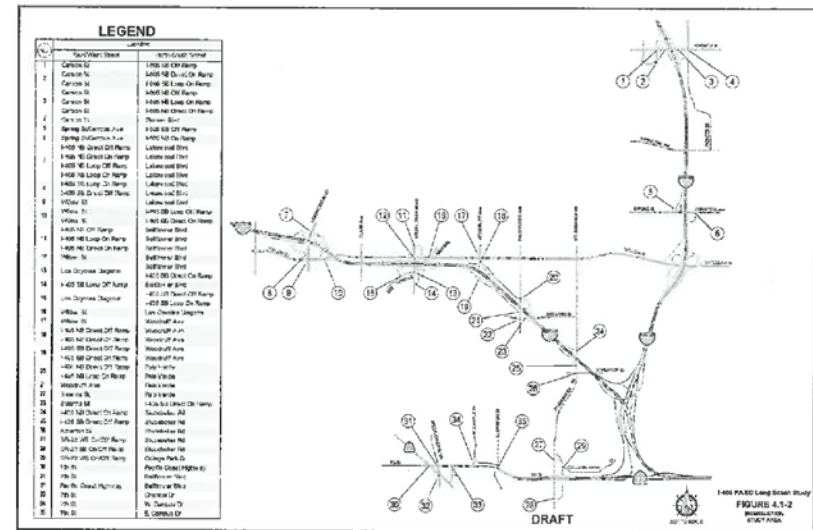
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Orange County Transportation Authority
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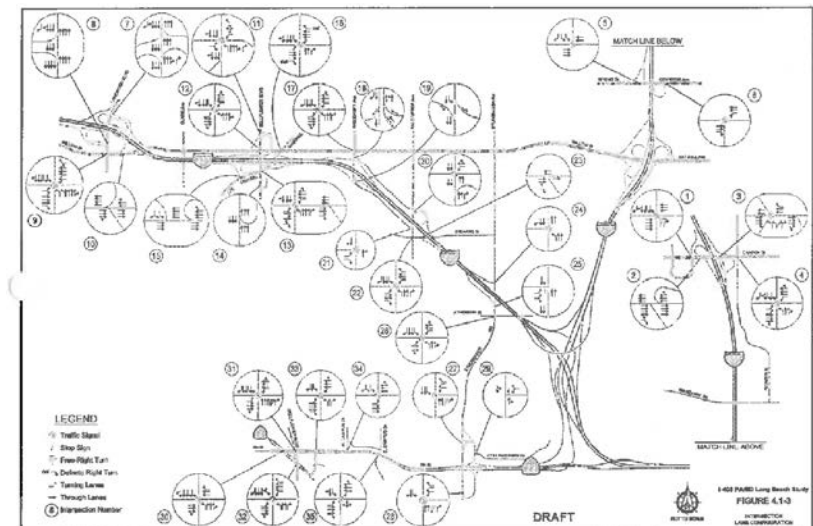
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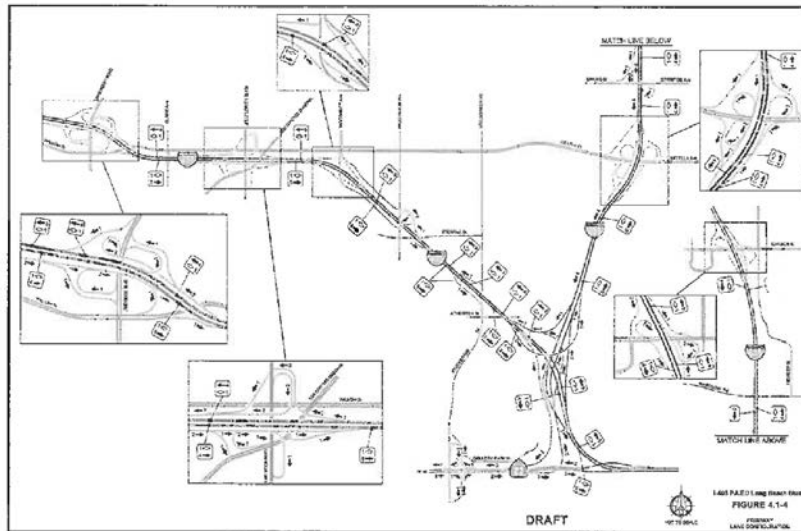
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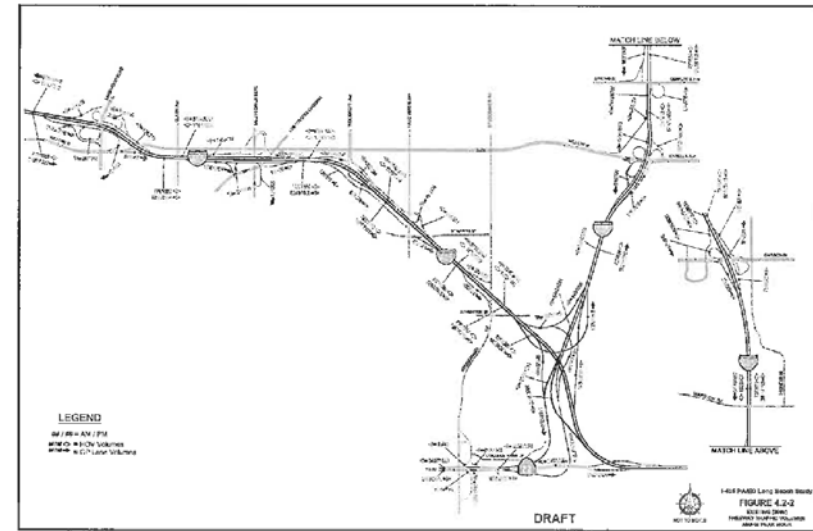
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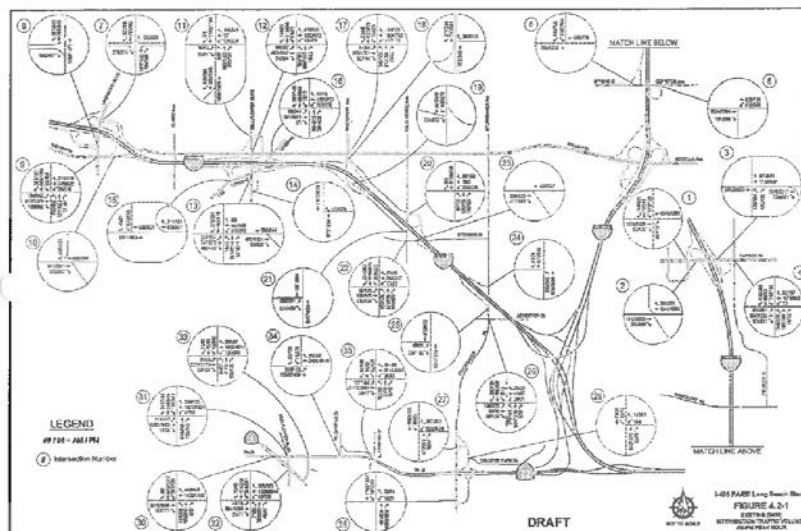
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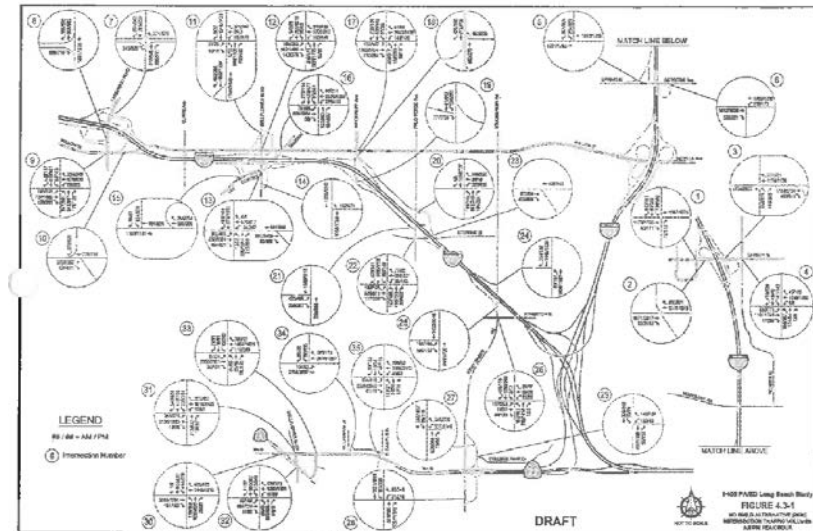
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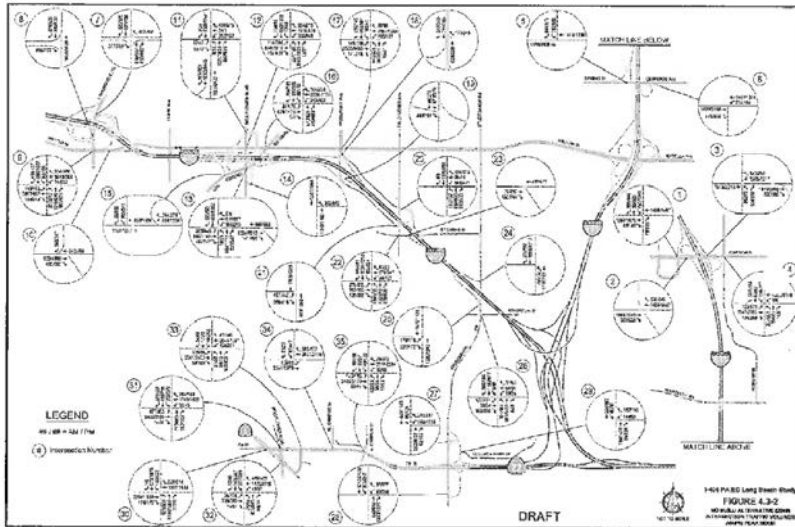
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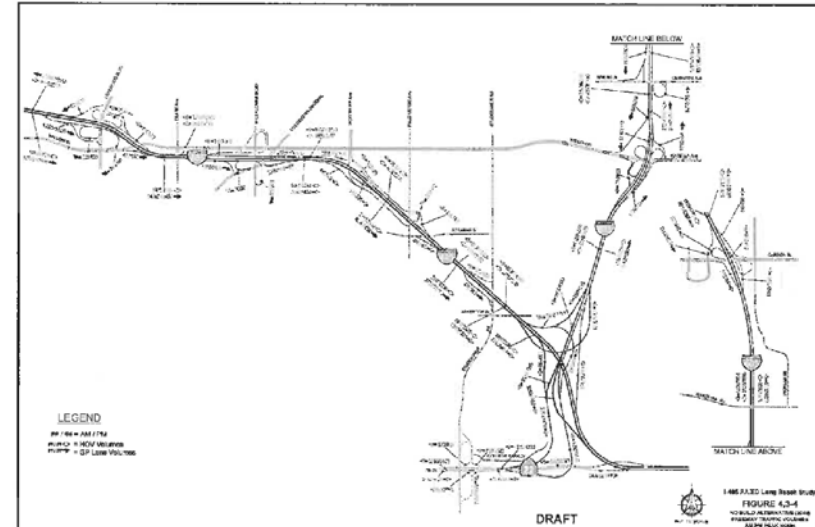
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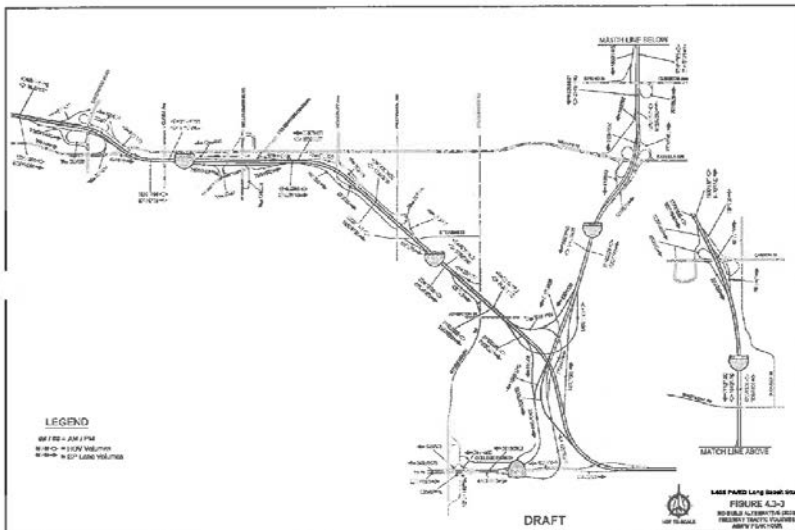
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GL-9 (Continued)



GL-9 (Continued)



GL-9 (Continued)

